THE IRON TRADE REVIEW

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FOREIGN IRON

HAVING SOME INFLUENCE ON AMERICAN MARKET.

Bear Assault in England on Warrants.—Postponement of Southern Freight Advance Received With Much Favor.

Keen interest has been manifested in the pig iron market during the past week. The situation resembles that of the first week of the new year when there were well defined indications of easier conditions, but during the last three weeks of January the market was active and strong, and there is now no reason for believing that there will be any decided decline in quotations.

Buying in England. Following the publication about two weeks ago of reports of weakness in the American pig iron market, a determined bear assult was made on warrant iron from England, and at least one large American consumer was able to buy a round tonnage at about $16.50 New Orleans. The report of this transaction has been noised about within a few days, and has caused hesitancy on the part of some buyers, but all indications are that it would be extremely difficult to buy any considerable tonnage of foreign iron at so low a price, and it is not probable that the importation of iron will result in demoralizing prices in this country to any marked extent. Practically all of the foreign iron which can be delivered before April 1 has been sold and the amount that can be landed in this country after that date does not promise to be very large. The assurance that the greatest possible effort will be made to deliver iron from the south during the remainder of this month has caused an easier feeling among some northern consumers of the southern product, but serious doubt is expressed as to whether the railroads will be able to give much better delivery than has recently been made. Taken as a whole, the pig iron market is easier, but with little, if any, evidence of weakness. Sales of southern iron on the basis of $18.50 Birmingham, of Bessemer at $21.50 valley and No. 2 foundry at $22 valley, all for last half, indicate that prices are being firmly maintained, although some concession might be made on very desirable business.

Southern Freight Rate. Announcement that the leading southern trunk lines have decided to postpone for a month the date at which the advanced freight tariff on pig iron was to have become effective has been received with much favor by all shipping interests. The concession is an admission that the proposed advance was unfair and by their action the southern lines have done much toward soothing the wrath of both furnace men and consumers and have paved the way for co-operation of all concerned in improving freight conditions in the south. The incident is a striking illustration of what can be accomplished by dignified protest entered in a worthy cause. It is intimated that unless all December and January iron has been moved by the time the advance becomes effective another postponement may be made.

Activity Continues. In finished lines great activity continues and deliveries are still much delayed. The only unfavorable incident has been the postponement of the placing of some orders for rails on account of the tightness of the money market, but mills are sold so far ahead that they are not uneasy about their delay.

TO LARGE CONSUMERS

Imported Pig Will Go.—Republic Declares Dividend.

(Special Telegram.)

New York, Feb. 6.—The pig iron market is quiet and firm. Indications are that little foreign iron to arrive during February and March will be placed on the open market. If unsold by time of arrival, it will go direct to large consuming interests under arrangements already made. This removes the only possibility of weakness in this district.

The Republic Iron & Steel Co. has declared the regular quarterly dividend of one and three-fourths per cent on preferred stock, with two per cent on deferred dividends, leaving only two per cent in arrears.

Relative to widely circulated press reports that the United States Steel Corporation is to begin work in April on a large plant in Canada opposite Detroit, Judge Gary says: "Nothing has developed since publication of the statement previously given out by me."

The report that the Corporation is negotiating for the purchase of the mining properties of the Great Lakes Co., Pittsburg, is pronounced without foundation.

President Corey returned from Europe Tuesday.

TROLLEY LINES BUY RAILS.

(Special Telegram.)

New York, Feb. 6.—Trolley lines continue to contribute heavily to current rail business, although the tonnage being placed is considerably below inquiries. Among recent sales reported is one lot of 7,000 tons for a Utah trolley line. A Washington line has closed for 1,000 tons and scattering orders aggregate about 5,000 tons.

A New Mill's Record.—Milliken Bros., Inc., New York, broke all records on their new blooming mill on Staten Island for the night turn Jan. 22-23, turning out 356 gross tons of billets and blooms. This record is quite phenomenal, considering that this mill is new, and that during this turn 155 minutes were lost waiting for steel.

THE WEEK IN IRON CENTERS.

PITTSBURG.

Large Consumers of Pig Iron are Not Buying.—Prices Show Little Change.

Office of THE IRON TRADE REVIEW, 521 PARK BUILDING, Feb. 6

While there has been nothing really unfavorable in general market conditions, either in the present situation or the outlook for the future, which is taken as last half of the year, there has been a little bit more bear talk going the rounds than has been heard for several months past. In pig iron this relates to softer prices for the last half of the year and on rails, which are usually taken as a fair criterion of future conditions, several large negotiations have been held up indefinitely on account of tightness in the money market. Rail mills, however, are now booked up to September at least. On the other hand, there is talk on nearly every hand of a nearby boom in structural work, and this is particularly true from Chicago and central western territory. In other finished lines, including sheet products, iron and steel bars and plates, the movement has been tremendous and there is no sign of a break in any direction. Specifications continue to come in excess of mill shipment and deliveries are in anything but good shape, plates extending from three to seven months, sheet products about 16 weeks, structural five to eight weeks, merchant pipe three months and other finished lines in proportion.

Pig Iron.—Several large tonnages of foundry iron for second quarter and last half deliveries have been closed during the week under review, the largest single contract being for 12,000 tons of No. 2 northern foundry with a southern Ohio furnace for delivery at Chicago. The buying in the central west has been heavier than in the Pittsburg district, and on account of inability to get iron in that immediate territory, the western inquiries have been coming into this market. One interest very close to the Pittsburg district during the past week bought 8,000 tons of foundry iron, part northern and part southern for last half delivery, on the basis of $18.50 Birmingham for the southern iron. Another Pittsburg interest bought 6,000 tons of foundry iron, paying $22 furnace for 3,000 tons, $21.50 and $21.75 for the remainder. The situation seems to be that the larger consumers are permitting the market to stand still at the present time as it is and not force it, waiting for some particular interest to start the buying movement, which is expected within a short time. Last half northern foundry iron is quoted $21.50 to $22 furnace, and for second quarter $23.50 furnace, although one valley furnace interest is quoting $25 to $25.50 for spot iron, and practically the same for second quarter, while this particular brand of iron is being held at $24 for last half delivery or about $2 above the regular market. During the past week about 7,500 tons of Bessemer iron has been sold for last half delivery at $21.50 valley, and 2,500 tons for second quarter delivery at $22.50 valley. Basic iron for second quarter delivery is extremely scarce and is held at prices almost equal to that commanded by foundry iron. Southern No. 2 foundry is held at $18.50 to $19 Birmingham for last half delivery. Buyers of southern foundry iron are greatly elated over their victory in successfully combatting the 25-cent freight rate advance announced to go into effect Feb. 1.

The Jones & Laughlin Steel Co. has had a particularly hard run of luck during the past two weeks, and three stacks, Nos. 2, 3, and 5 of the Eliza group, are now out of blast for repairs. This condition of affairs has cut down the company's supply of pig metal by almost half and made it necessary to secure iron from outside sources, but arrangements were made so that it was not necessary to go into the open market for the supply, and this circumstance has in no way been felt on the market. One of these furnaces will be in commission within a week and the other two within a month. On second quarter delivery we quote as follows:

Bessemer Valley	$22.00 to 22.55
Bessemer, Pittsburg	22.85 to 23.30
No. 1 Foundry, Pittsburg	24.85 to 25.10
No. 2 Foundry, Pittsburg	24.35 to 24.60
Gray Forge, Pittsburg	22.25 to 22.50
Basic, Valley	22.00 to 22.50
Basic, Pittsburg	22.85 to 23 15

Ferro-Manganese.—For spot delivery foreign 80 per cen ferro-manganese is quoted $77 delivered Pittsburg, and for delivery during the last half of the year $70 to $71. Imported 50 per cent ferro-silicon is quoted $108 to $110; 12 per cent $36; 11 per cent, $35.

Muck Bar.—A careful inquiry among the producers of muck bar in the Pittsburg district has very plainly brought out the fact, as has been intimated in these reports for some time past, that there is practically no muck bar to be had on new contracts and producers will not even quote prices on inquiries for new business. The nominal market for all pig metal muck bar is $37 delivered Pittsburg, and for part scrap bar $35.

Skelp.—With the very heavy specifications against existing contracts and the extreme pressure for deliveries, skelp makers are in no position to take on new business and it is doubtful if a contract for any tonnage could be placed for delivery short of three to four months. The following prices which are nominal are quoted on the light gages and narrow widths with the usual differentials on heavier stock:

Bessemer, grooved, 1.70c to 1.75c; sheared, 1.70c to 1.75c; basic, grooved, 1.80c to 1.85c; sheared, 1.75c to 1.85c; iron skelp, sheared, 2.15c to 2.25c; grooved, 2c to 2.10c.

Plates.—As far as the leading interest is concerned, it is entirely out of the market and has been for about two months. It is refusing to accept further business and the pressure of specifications against existing contracts is much heavier than the capacity of the mills to make shipments. This is true also of the largest independent interest, although not to the same extent, its delivery being three to fourth months. The steel car companies are receiving practically about 75 per cent of their requirements and under the circumstances surrounding the general market have no well founded grounds for complaint, although irritated at the delay in receiving their material, being compelled to run at less than full capacity on this account. Eastern mills quoting premium prices are receiving apparently little business, this consisting only of absolutely must stuff. The official quotations, which are nominal for delivery short of four months, are as follows:

Tank plate ¼-inch thick, 6¼ to 100 inches, 1.70c f. o. b. mill Pittsburg. Light plate schedule, No. 10, 1.80c; Nos. 11-12, 1.85c; Nos. 13-14, 1.90c; Nos. 15-16, 2c. Extras on the regular plate schedule are as follows per 100 pounds: Boiler and flange steel plates 0.10c; A. B. M. A. and ordinary fire box steel plates, 0.20c; still bottom steel, 0.30c; marine steel, 0.40c; locomotive firebox steel, 0.50c; all sketches, excepting straight taper plates varying not more than four inches in width at ends, narrowest end not being less than 30 inches, 0.10c; complete circles, 0.20c. Plates in width over 100 inches up to 110 inches, 0.05c; over 110 inches up to 115 inches, 0.10c; over 115 inches up to 120 inches, 0.15c; over 120 inches up to 125 inches, 0.25c; over 125 inches up to 130 inches, 0.50c; over 130 inches, 1.00c. Gages under ¼-inch to and including 3-16-inch plates on thin edges, 0.10c; under 3-16-inch to and including No. 8, 0.15c; under No. 8 and including No. 9, 0.25c. Five cents extra for less

than carloads. Terms, net cash in 30 days.

Sheets.—January for the leading interest exceeded any previous January in the history of the company and there has been no let up in the demand for material on specifications. A substantial new business is being placed, but the best delivery promise is 10 weeks. The recent advance in galvanized sheets, galvanized corrugated roofing and blue annealed sheets is firmly established and being maintained. In some instances mills in position to give reasonably prompt delivery are securing a premium for their goods. We quote as follows:

Black steel sheets, one pass, cold rolled: Nos. 11-12, 2.20c; Nos. 13-14, 2.25c; Nos. 15-16, 2.30c; Nos. 17-21, 2.35c; Nos. 22-24, 2.40c; Nos. 25-26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 29, 2.75c; No. 30, 2.85c; galvanized Nos. 10-11, 2.65c; Nos. 12-14, 2.75c; Nos. 15-16, 2.85c; Nos. 17-21, 3.00c; Nos. 22-24, 3.15; Nos. 25-26, 3.35c; No. 27, 3.55c; No. 28, 3.75c; No. 29, 4.00c; No. 30, 4.25c. Corrugated roofing, $1.85 per square for No. 28 painted, 2½ inch corrugation and $3.25 per square No. 28 galvanized, 2½ inch corrugation. Blue annealed sheets, No. 10 and heavier, 1.85c; Nos. 11-12, 1.90c; Nos. 13-14, 1.95c; Nos. 15-16, 2.05c.

Tin Plate.—The leading interest has not yet announced its third quarter price, although some of the independent interests are accepting business for this for forward delivery at figures ten cents per base box above present official prices. We quote as follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.90 f. o. b. mill, Pittsburg district. Terms, 30 days, less two per cent for cash in 10 days.

Hoops and Bands.—There has been nothing unusual in this market for several months past, although mills have a large tonnage on their books and specifications are heavy. There has been no change in prices, and no action is expected much before the beginning of the next contract period. We continue to quote as follows:

Hoops, in carload lots, 2c; in less than carload lots, 2.10c; bands, 1.60c base, half extras as per standard steel.

Rails and Track Material.—The financial situation is such at present that it is holding up several large rail contracts which, were it not for the tightness of the money market, would have been closed some time ago. Among these are two traction roads with a total of 70,000 tons. The sales by the local mills during the week under review were 13,000 tons standard sections and about 3,500 tons light rails, no individual contract amounting to much more than 1,000 tons. The Bessemer & Lake Erie road has placed a contract with the Carnegie Steel Co. for 140,000 steel ties, a sufficient number to relay 40 miles of ties from Conneaut harbor on the lake to Pittsburg. The International railway, of Buffalo; the Syracuse Rapid Transit, of Syracuse, N. Y., and the Richmond Railway & Light Co., of Staten Island, placed orders for steel ties, the total of the three contracts being about 9,000 14½-pound. The International, of Buffalo, last year laid 8,600 of these ties and the new contract covers additional work along the same lines. Several other steam and electric roads are also interested and figuring on the installation of steel ties. We quote as follows: Fifty-pound and heavier, 500-ton lots and over, $28; carloads and less than 500 tons, $30; less than carload lots, $32; 8-pound, $40; 12-pound, $36 to $37; 16-pound, $35 to $36; 20-pound, $34 to $35; 25 to 45-pound, $33 to $34; angle splice bars for standard sections, $1.65; spikes for forward deliveries, $2.50.

Merchant Bars.—While the new business in steel bars is apparently light, the specifications against existing contracts are enormously heavy. Bar iron has been moving slowly in regard to tonnages, but the price is very firm at 1.80c in carloads, 1.85c in less than carloads for the Pittsburg district, 1.60c base Pittsburg plus freight from point of shipment from western mills for western shipment. We quote:

Common iron bars, 1.80c Pittsburg in carload lots and over, 1.85c in less than carloads; Bessemer steel bars, 1.60c, net; plow and cultivator, 1.60c, net; channels, angles, zees, tees, under three inches, 1.70c, all f. o. b. Pittsburg. The following differentials are maintained on steel: Less than 2,000 pounds, 0.10c advance; less than 1,000 pounds of a size 0.30c advance. Cold rolled and ground shafting, 50 per cent off in carload lots, and 5 per cent off in less than carloads, delivered in base territory; open-hearth spring steel, 2.25c to 2.50c; sleigh shoe flats, 1.60c to 1.65c; smooth finished machinery steel, 1.90c to 2c; toe calk, 2.10c to 2.15c. The price of planished and machine straightened tire is 1.80c, base, half tire extras. Iron finished tire up to 1½ inch and over to be sold on regular bar basis of 1.60c base, half extras, steel card.

Structural Material.—The number of inquiries for material has increased and the reports from various parts of the country are to the effect that a large volume of business is now in preparation and will be submitted for bids within a very short time. As far as current work for the mills is concerned, the volume is not large. This condition is not causing any uneasiness, as the supply of semi-finished material usually going to the structural mills may on this acount be diverted to other finishing mills where the demand for material is very pressing. There is no change in prices, and we quote as follows:

Beams and channels, 15-inch, and under, 1.70c; over 15 in., 1.80c; zees, 1.70c; tees, 1.70c; angles from three to six inches inclusive, 1.70c; over six inches, 1.80c; universal and sheared plates, 6¼ inches and wider, 1.70c base.

Wire and Wire Nails.—The exceedingly prosperous business which has been the rule since last summer has continued and mills are unable to a very large degree to make shipments according to specifications against existing contracts. New business is not being sought and the inquiries by jobbers would indicate that they in turn have received very heavy increase from their customers and are specifying further ahead than usual in order to meet this early heavy demand for spring. There has been no change in prices, and we continue to quote as follows:

Wire nails, jobbers' carload lots, $2; retailers' carload lots, $2.05; less than carloads, $2.10; painted barb wire, $2.15, for jobbers in carloads; retailers in carloads $2.20c; and less than carloads, $2.30, with 30c for galvanizing; plain wire, $1.85 for jobbers and $1.90 by carload.

Merchant Pipe.—The past week brought out an inquiry for 60 miles of eight, ten and twelve-inch line pipe for a new Kansas company, but from the nature of the inquiry it will probably be some time before negotiations are definitely closed. The usual heavy business of the past several months is still in evidence with no likelihood of it abating, and mills are for the most part filled up to their capacity for delivery short of three months. The advance of Jan. 25 is firmly established and jobbers' discounts are now 76 base, base sizes, and five, consumers' carloads base discounts are as follows:

	Steel black	Steel galv.
⅛ to ¼ inch	68	50
⅜ inch	68	54
½ inch	70	58
⅝ to 6 inches	74	64
7 to 12 inches	69	54
EXTRA STRONG PLAIN ENDS.		
⅛ to ⅜ inch	59	47
½ to 4 inches	68	54
4½ to 8 inches	63	50
Double extra strong plain ends, ⅜ to 8 inches	55	44

Wrought Pipe.—The leading wrought pipe interest in this district has so far filled up on business that new inquiries are being turned aside, and no delivery promises of a definite nature are being made. The demand for material is far in excess of the supply. Prices are very firm at the recent advance and

the official discount on large lots is 69 on base sizes. We quote:

	Card black	Weight galv
⅛, ¼ and ⅜ inch	61	45
½ inch	64	53
¾ to 4 inch	69	59
PLUGGED AND REAMED.		
1 to 4 inch	67	57
EXTRA STRONG PLAIN ENDS.		
⅛, ¼ and ⅜ inch	54	42
½ to 4 inch	61	58
DOUBLE EXTRA STRONG.		
¾ to 4 inch	50	39

tLess carloads, two points higher discoun

Boiler Tubes.—There is a very heavy new demand and specifications against standing contracts are very heavy. The market is strong and prices are very firm at the advance of Jan. 25. We quote as follows:

Boiler tubes.	Steel	Iron
1 to 1¼ inches	47	47
1¼ to 2¼ inches	59	42
2¼ inches	61	42
2¼ to 5 inches	67	54
26 to 13 inches	59	42

Less than carloads two points less.
2½ inches and smaller, over 18 feet, 10 per cent, net, extra.
3¼ inches and larger, over 22 feet, 10 per cent, net extra.

Steel.—The situation in regard to semi-finished Bessemer steel has not improved to any appreciable extent, talk going the rounds to the contrary notwithstanding. The leading interest, Jones & Laughlin Steel Co., Youngstown Sheet & Tube Co., and the Republic Iron & Steel Co., are out of the market as far as Bessemer steel for nearby or first quarter delivery is concerned, and the only steel offered is by the smaller concerns having a surplus in excess to their own requirements, and there is not enough sold outside of the interests mentioned to affect the market one way or the other. Steel offered outside of the Pittsburg district has been brought in in some quantities, but at price almost prohibitive with the ruling price of finished material. It is true that open-hearth semi-finished steel has been a trifle more plentiful, due to the coming in of smaller independent interests, but this supply has not been sufficient to in any way weaken the market. On soft Bessemer billets we quote $29.50 Pittsburg and on open-hearth $31 to $32; sheet bars are quoted nominally at $30.

Coke.—There has been no material change in the coke situation, and the demand for spot furnace coke is good and more business for last half has been done during the week. The weather conditions have not seriously handicapped operations in the region. The supply of cars is adequate. For spot shipment furnace coke we quote $3.75 and for shipment prior to July 1, $3.40. For shipment during the remainder of the year we quote $3.10 to $3.15. Foundry coke for spot shipment is quoted $3.85 to $4.00, and for the first half $3.85. Foundry coke for shipment during the remainder of the year is quoted $3.75. All quotations at the oven.

Old Material.—The quiet of the past two weeks still continues in the scrap market and there is very little going on outside of a few transactions between dealers. The large consumers, while they are ready to buy for forward delivery, have not yet reached the point where they are willing to pay the prices asked by the dealers and are holding out for their price of $18 for heavy melting scrap, at which figure they would willingly close for a large tonnage.

For prompt shipment delivered in the Pittsburg district, we quote as follows:

Heavy melting scrap, $18.50 to $19; re-rolling rails, $21 to $21.50; bundled sheet scrap, $16 to $16.50; iron axles, $30.50 to $31; old iron rail, $26 to $26.50; No. 1 wrought scrap, $20 to $20.50; old car wheels, $23 to $23.50; low phosphorus scrap, $22 to $22.50; machine shop turnings, $14.75 to $15.25; axle turnings, $16.50 to $17; cast borings, $12.50 to $12.75; No. 1 cast scrap, $20 to $20.50.

CHICAGO.

Some Uncertainty in Pig Iron.—Rail Contracts Offered.

Office of THE IRON TRADE REVIEW, 1362 MONADNOCK BLOCK, Feb. 5

Pig iron is the center of attraction because of the many adverse currents affecting it. The agitation for the repeal of the advance in southern freight rates, the loud protests against the exasperating delays to shipments and the efforts of several large consuming interests to secure low prices have produced a situation containing an element of uncertainty. This is manifested by a disposition on the part of smaller melters to postpone purchases until it is more definitely known what the railroads will accomplish in the next thirty days towards moving the large tonnage of iron that has accumulated on southern yards despite the opportunity offered them of contracting at the minimum prices that have ruled for the last half. Southern No. 2 foundry for the fourth quarter is held by some sellers at $18 Birmingham, but for the third quarter or last half $18.50 is almost universally quoted.

Tentative offers of rail contracts for 1908 shipment are the principal development in finished material. None resulted in closure, however. New tonnage and specifications for plates continue very heavy. Early deliveries are hard to obtain, and mill shipments are firm at a minimum of 1.70c Pittsburg. Demand for structural material is slow, and to provide an increased supply of billets, of which the Illinois Steel Co. is short, the South Chicago structural mill will again be transferred to that product. The movement in tubular goods is free, especially in cast iron pipe, for which municipalities and gas companies are contracting heavily. The weakness in scrap has been further accentuated by the offering this week of new railroad lists aggregating 12,800 tons.

Pig Iron.—Southern roads announce a postponement for thirty days of the 25-cent advance in the freight rate between Birmingham and the Ohio river that was authorized to take effect Feb. 1. Within this period, an energetic effort is promised to start on its way northward, the 60,000 tons or more of iron that has accumulated on furnace yards for want of cars to move it. This announcement has resulted in an easier feeling in the local market.

Prices have not changed, but demand for spot iron has subsided and a halting tendency is shown by those who have been giving consideration to last half purchases. This hesitency is almost wholly confined to transactions with southern furnaces because of their greater delinquency in shipments and if the promised movement is very heavy, the procrastination of buyers is likely to be extended over a longer period than is now anticipated. Among the inquiries for northern iron received in the past few days is one involving 12,000 tons of malleable Bessemer, another for 10,000 tons of Lake Superior charcoal, both for last half delivery, in addition to several others ranging from 1,000 to 5,000 tons. Malleable Bessemer is offered at $23.30 to $24 Chicago for the last half, the lower price being quoted by Ohio furnaces and the higher price by local stacks. Lake Superior charcoal is firm at $25 furnace for the same delivery. The statement in this column last week that charcoal iron was selling at $25 Chicago was erroneous and due to a misunderstanding.

Southern schedules in this market have suffered no change, furnaces being adamant at $23 Birmingham, for the first quarter, $22 for the second quarter, and $18.50 for the third quarter or last half. Our prices have been revised because of the change in freight rates.

We quote as follows:

Lake Superior charcoal	$ 26.50
Northern Foundry No. 1	24.50 to 25.00
Northern Foundry No. 2	24.00 to 24.50
Northern Foundry No. 3	23.50 to 24.00
Northern Scotch Foundry	24.50 to 25.00
Ohio Strong Softeners No. 1	23.30 to 23.80
Ohio Strong Softeners No. 2	22.80 to 23.30
Southern Foundry No. 1	23.10 to 23.60
Southern Foundry No. 2	22.60 to 23.10
Southern Foundry No. 3	22.10 to 22.60
Southern Foundry No. 4	21.60 to 22.10
Southern No. 1 Soft	23.10 to 23.60
Southern No. 2 Soft	22.60 to 23.10
Southern Gray Forge	21.10 to 21.60
Southern Mottled	19.60 to 21.10
Southern Silveries 4 per cent to 6 per cent Silicon	25.60 to 26.10
Jackson Co. Silveries, 8 to 10 per cent Silicon	31.80 to 32.30
Malleable Bessemer	24.00 to 25.00

Rods and Billets.—Transactions are restricted to extremely small lots because of the scarcity of both products. Prices nevertheless are firm at $38 Chicago for forging billets, and $37 to $38 Pittsburg for wire rods.

Iron and Steel Bars.—Western iron mills are comfortably filled with business, and in some quarters there is a disposition to refuse additional tonnage except at attractive prices. Quantity buyers, however, have no difficulty in placing orders at 1.60c Pittsburg; for smaller lots, the market ranges from 1.81½c to 1.85c Chicago, according to the tonnage offered and delivery required. Specifications for steel bars maintain their past volume. Shipments from mills continue slow because of the scarcity of crude steel. We quote for Chicago delivery as follows: Hard steel angles, 1.75c; soft steel bars and bands, 1.76½c, half extras; soft steel angles less than 3 x 3, 1.86½c; hoops, 2.16½c base, full extras; old rail stock, 1.70c. We quote bar iron from stock 2.25c; full extras; soft steel rounds and squares, 3 inches and larger, $2 per 100 pounds base; flats, 2 inches to 4 inches by 1⅛ inch and larger, $2 per 100 pounds base; 4½ inches x 5 inches and 6 inches x 5-16 inch and thicker, $2 per 100 pounds base; all ovals, half rounds, $2 per 100 pounds base; steel bands, $2, half extras; soft steel hoops, 2.40c to 2.50c, full extras. Other sizes not mentioned above, $2 per 100 pounds base plus half extras.

Plates.—The inability of mills to give early deliveries on either sheared or universal plates is deflecting considerable tonnage to jobbers' channels. Mill quotations are firm at a minimum of 1.70c Pittsburg, upward. We quote: Plates ¼ inch and thicker 6⅛ to 100 inch wide, either universal or sheared, 1.70c Pittsburg base. For extras, see Pittsburg report. Freight rate to Chicago, 16½c per 100 lbs. Jobbers' prices for shipment from local stocks are as follows: Tank steel ¼ inch and heavier up to 72 inches wide, 2.20c; 72 inches up to 96 inches wide, 2.30c; 3-10 inch up to and including 60 inches wide, 2.30c; 3-16 inch 72 inches wide, 2.55c; No. 8 up to 60 inches wide 2.35c; flange steel, 25c extra; heads, 25c extra.

Sheets.—Demand for all gages, black and galvanized, has been stimulated by the advances announced last week. Specifications are received freely. The tonnage outlook is good and the market is firm. We quote carload lots, as follows:

Black sheets Nos. 8, 9 and 10, 1.90c Pittsburg; No. 28 gage, 2.60c Pittsburg. Galvanized sheets No. 28 gage 3.75c Pittsburg. Freight to Chicago 16½c per 100 pounds. Jobbers' prices on less than carload lots from store are as follows: No. 10, 2.25c to 2.30c; No. 12, 2.30c to 2.35c; No. 14, 2.35c to 2.40c; No. 16, 2.45c to 2.50c; Nos. 18, 20, 2.70c to 2.80c; Nos. 22, 24, 2.75c to 2.85c; No. 26, 2.80c to 2.90c; No. 27, 2.85c to 2.95c; No. 28, 2.95c to 3.05c; No. 30, 3.35c.

Galvanized sheets, Nos. 10 to 20, 3.40c to 3.45c; Nos. 22 and 24, 3.55c to 3.60c; No. 26, 3.75c to 3.80c; No. 27, 3.95c to 4c; No. 28, 4.15c to 4.20c; No. 30, 5.35c to 5.40c.

Structural Steel. — The American Bridge Co. reports contracts for 1,250 tons for the Paulsen building, Spokane, Wash., and 600 tons for the county court house, Memphis, Tenn. The only important local contract pending is that for the Lehigh Valley coal shed to be erected in South Chicago, the steel requirements of which amount to 2,000 tons. Specifications on contracts with local mills are rather light, and none is operating to full capacity. Prices are firm as follows:

Beams and channels, 3 to 15 inches inclusive, 1.70c Pittsburg. For extras see Pittsburg report. Freight rate from that city to Chicago is 16½c per 100 pounds. Quotations from store are as follows:

All angles, three inches and larger, including six inches, $2.05 to $2.10 per 100 pounds; angles over six inches, $2.15 per 100 pounds base; beams, three inches to 15 inches, inclusive, $2.05 to $2.10 per 100 pounds base; channels, three inches and larger, $2.05 per 100 pounds base. Less than carload lots are $2 a ton higher than foregoing price.

Rails and Track Supplies.—Tentative inquiries have been made by some western roads concerning prices and deliveries of standard sections in 1908, but as yet no disposition is shown by mills to publicly open their books for this delivery. Several good sized orders have been placed for this year's shipment, and about 50,000 tons additional are pending. Track supplies and light rails continue in good demand. We quote as follows:

Bessemer rails, $28 to $30; less than 500-ton lots, $32; open-hearth rails, $29; light rails, Bessemer, 30 to 45-pound sections, $33; 25-pound, $34; 20-pound, $35; 16-pound, $36; 12-pound, $37, and lighter sections down to 8-pound, $43.50, all f. o. b. mill. Track supplies vary in price according to quantity and delivery. Angle bars in large lots are quoted 1.65c to 1.75c; for smaller quantities, 2.25c to 2.75c; spikes, large lots, 2.25c; for smaller quantities, 2.50c; bolts, large lots, 2.65c to 2.75c; smaller lots, 2.85c with square nuts, and 3c with hexagon nuts.

Merchant Steel.—Implement manufacturers generally are specifying in excess of their contract requirements. Activity is so rampant in these lines that new tonnage is restricted only by the capacity of mills. Prices are without change as follows:

Planished or smooth finished tire steel, 1.96½c; iron finish, up to 1½ x ½ inch, 1.91½c; base iron finish 1½ x ½ inch, and larger, 1.76½c; base channels for solid rubber tires, ¾ to 1 inch, 2.26½c, and 1⅛ inch and larger, 2.16½c; smooth finished machinery steel, 2.01½c; flat sleigh shoe, 1.81½c; concave and convex sleigh shoe, 2.06½c; cutter shoe, 2.35c; toe calk steel, 2.31½c; railway spring, 1.96½c; crucible tool steel 6½c to 8c, and still higher prices are asked on special grades. Shafting is very strong and an advance is expected. Quotations are without change at 50 per cent off in car lots and 45 per cent in less than car lots, in base territory.

Cast Iron Pipe.—The only letting of importance in the week under review was that of the city of St. Paul, 500 tons, which was awarded to the Dimmick Pipe Co. Gas companies are buying freely, and there is also a good demand in small lots for betterments, extensions, etc. The New Orleans contract is still pending. We quote prices, Chicago delivery, as follows: Four-inch water pipe, $38.60; 6 to 12-inch inclusive, $37.60; 16-inch and upwards, $1 a ton less; gas pipe, $1 a ton higher on all sizes.

Merchant Pipe.—The congestion of orders on mill books is severe. Deliveries are slow because of the car shortage and scarcity of raw material. Prices are firm as follows: ¾ to six inches black steel pipe, 74.35 per cent discount; galvanized, 64.35 per cent discount. From store in small lots, Chicago distributors are asking 72½ per cent discount on the base sizes.

Boiler Tubes.—Demand for tubes has improved considerably in the last few weeks. Jobbers report an especially brisk movement, and because of the difficulty in replenishing their stocks are considering another advance in prices. We quote as follows: 2¾ to five inches, steel, 65.35; iron, 54.35; seamless, 50.35; 2½ inches and smaller and lengths of over 18 feet; and 2½ inches and larger, and lengths over 22 feet, 10 per cent extra. On less than carload lots from store, we quote 60 off for steel; 47½ for iron and 47½ for seamless.

Wire Products.—Hardware jobbers report an extremely active movement in wire nails. Stocks are low and it is with difficulty that adequate shipments can be obtained from manufacturers. The latter are contending continually with a shortage of steel, as well as of cars, and at the present rate of production and consumption a serious shortage is anticipated with the advent of spring business. Independent manufacturers

are also clamoring loudly for heavier shipments of smooth wire for fence production. Jobbers' quotations, Chicago delivery, are firm as follows: Wire nails $2.15; painted barbed wire, $2.30; galvanized barbed wire, $2.60; smooth annealed wire, $2.30; polished staples, $2.30; galvanized staples, $2.55. Carload lots to retailers, five cents higher; less than carload lots, 15 cents higher.

Coke.—Activity is light because of the increased shipments that are arriving from producing points. Prices remain unchanged at $4.25 to $4.50, ovens, according to grade and delivery. Local by-product coke is firm at $6.90 to $7.15 Chicago.

Old Material.—The downward tendency of the market has been further accentuated in the past week by the large offerings of railroads. These aggregate 12,800 tons divided into the following lists: Baltimore & Ohio, 6,500 tons; Santa Fe, 2,800 tons; Northern Pacific, 1,800 tons; Chicago & Northwestern, 1,200 tons, and Wisconsin Central, 580 tons. Demand from consuming sources is largely for cast scrap, turnings and borings, and on these materials prices are holding their own. Car wheels are softer, being now quoted at $24.50 Chicago. Re-rolling rails are moving freely, but are not gaining in price. We have revised our prices, and quite gross tons in the first paragraph, as follows:

Old Steel Rails (4 feet and over)	$19.00 to 19.50
Old Steel Rails (less than 4 feet)	18.00 to 18.50
Old Car Wheels	24.75 to 25.00
Old Iron Rails	26.00 to 26.50
Relaying Rails, subject to inspection	31.00 to 32.00
Frogs, Switches and Guards	16.50 to 17.00
Heavy Melting Steel	16.00 to 16.50
Mixed Country Steel	13.50 to 14.00

We quote net tons, as follows:

No. 1 R. R. Wrought	$16.00 to 16.50
No. 2 R. R. Wrought	15.00
Shafting	17.50 to 18.00
Dealers Forge No. 1	12.50 to 13.00
Wrought Pipe and Flues	11.50 to 12.00
No. 1 Cast, 150 pounds and less	18.00
No. 1 Mill	10.50 to 11.00
Mixed Busheling (No. 1 & No. 2)	11.25 to 11.75
Country Sheet	9.00
No. 1 Boilers Cut	11.50 to 12.00
Boiler Punchings	15.00 to 16.00
Iron Car Axles	26.50 to 27.00
Steel Car Axles	21.50 to 22.00
Iron Axle Turnings	11.50 to 12.00
Cast Borings	9.00 to 9.50
Mixed Borings, etc.	9.00 to 9.50
Machine Shop Turnings	11.50 to 12.00
Railroad Malleable	16.00 to 16.50
Agricultural Malleable	15.00 to 15.50
Stove Plate and Light Cast Scrap	14.50 to 15.00
Old Iron Splice Bars	21.50 to 22.00

CLEVELAND.

Pig Iron Firm and Demand Fair.—Bar Iron Market Stronger.

Office of THE IRON TRADE REVIEW, Browning Building, Feb. 5.

Iron Ore.—There is some inquiry from furnaces which have not covered fully for their ore requirements, but very little of the higher grade is being offered for sale, although, as stated last week, some sellers found that their previous estimates were not entirely correct and have had some ore for sale. We quote as follows: Old Range Bessemer, $5.00; Mesabi Bessemer, $4.75; Old Range non-Bessemer, $4.20; Mesabi non-Bessemer, $4.00.

Pig Iron.—Some sellers report that the market is firm but quiet, while others state that activity of the last three weeks of January has been pretty well maintained during the first week of February. All agree that prices show no tendency toward weakness. Belated buyers for first half requirements are having a great deal of trouble in picking up iron which they need badly. Steel makers are conspicuous by their absence from the market, although some basic is being taken by them. The usual valley price for No. 2 foundry for the last half is $22, but it is probable that very desirable business would be taken at a somewhat lower quotation. We quote spot iron delivered at Cleveland as follows as a basis for settling contracts based on our quotations: No. 1 northern foundry, $27.00; No. 2 northern foundry, $26.50; No. 3 northern foundry, $26.00; No. 1 southern foundry, $28.10; No. 2 southern foundry, $27.60; No. 3 southern foundry, $27.10; 8 per cent silvery, $31.95. Very little spot iron can, however, be obtained at any price from either northern or southern producers. Foreign iron is being sold at about $25.50, but prompt delivery cannot be guaranteed. For the last half we quote, f. o. b. Cleveland, as follows:

Bessemer	$21.50 to 22.00
No. 1 Foundry	22.50 to 23.00
No. 2 Foundry	22.00 to 22.50
No. 3 Foundry	21.50 to 22.00
No. 2 Southern	21.85 to 23.35
Gray Forge	20.50 to 20.75

Finished Materials.—The bar iron market is considerably stronger than it was a week or two ago. The principal producer is far behind on its deliveries. Indiana mills are showing less eagerness for business. There is a very good demand for steel and it is difficult to obtain delivery in less than four months. Conservative consumers are showing a disposition to contract for steel bars for the last half. The recent advance in the price of sheets has not checked buying. Plates are firm and active and high premiums are being paid for prompt shipment.

Old Material.—The market is dull and quiet, with the exception of foundry scrap. Some dealers report a good demand for cast iron and stove plate. The future is uncertain and Cleveland dealers are simply waiting for some definite turn in the market. The present weather conditions have inspired hope in some quarters that their continuance may mean an advance in prices. We have revised our quotations and quote Cleveland delivery, gross tons, as follows:

Old iron rails	$25.00 to 26.00
Old steel rails (over 6 feet)	18.50 to 19.50
Old steel rails (under 6 feet)	17.50 to 18.50
Old car wheels	21.00 to 21.50
Steel boiler plate	14.00 to 15.00
Steel axles	22.00 to 23.00
Malleable iron (railroad)	18.50 to 19.50
Malleable iron (agricultural)	15.50 to 16.00
Heavy steel	16.75 to 17.50
Country mixed steel	14.50 to 15.50
Low phosphorus	23.00 to 24.00

We quote net tons as follows:

No. 1 R. R. wrought	$17.50 to 18.50
No. 1 busheling	15.00 to 15.50
No. 1 machine cast	18.00 to 18.50
Iron axles	25.50 to 26.00
Axle turnings	13.50 to 14.00
Wrought turnings (free from cast)	12.00 to 12.50
Grate bars	14.00 to 15.00
Pipes and flues	13.50 to 14.00
Tank iron	12.00 to 13.00
Hoop and band iron	8.50 to 9.00
Sheet iron	8.00 to 9.00
Wrought drillings	12.00 to 12.50
Stove plate	14.00 to 15.00
Cast borings	9.00 to 9.50

CINCINNATI.

Prices are Unchanged.—Heavy Inquiry for Malleable and Some Sales.

February 4.

Pig Iron.—The situation has not shown any change of importance during the week. Prices remain well established without either firmness or strength. There is some talk on the part of some southern furnaces of advancing prices, but in the main business is going and inquiries are bringing out unchanged quotations both as to northern and southern product. There has been a large inquiry for malleable iron in this market, and some sales on the basis of $21. at northern furnace. There is quite an active business in special irons. Inquiry for foundry grades for last half of the year delivery is fairly active. but buyers are not showing quite as much interest in the market as some weeks ago. The question now in the minds of buyers, is "Will the price basis in the last half of the year be more than $18.50 Birmingham or less?" So far as the selling agencies are concerned, the belief is along the line of maintained values, based on the condition of order books of furnaces.

There is much satisfaction over the action of the southern railroads in postponing the advance in freight rates until March 2. It is suggested that in view of this action it may be expected that the roads will make an effort to move as much iron as possible forward in the next thirty days in order to remove the main objection to making the advance effective. If this should be done, it may have some effect on the market by making buyers more complacent under an improvement in deliveries. We quote spot iron delivered at Cincinnati as follows, as a basis for settling contracts based on our quotations:

Southern foundry No. 1	$26.50 to 27.50
Southern foundry No. 2	26.00 to 27.00
Southern foundry No. 3	25.00 to 25.50
Southern foundry No. 4	24.00 to 24.50
Southern fdry, No. 1 soft	26.50 to 27.50
Southern fdry, No. 2 soft	26.00 to 27.00
Gray forge	22.50 to 23.00
Northern foundry No. 1	26.65 to 27.75
Northern foundry No. 2	26.15 to 27.15
Northern foundry No. 3	25.65 to 26.65
Jackson County silvery, 8 per cent	31.15

Spot iron is quoted at $25.00 at northern furnaces for No. 2 and at $23.00 Birmingham for southern brands. Second quarter delivery southern iron is quotable at $21.00 to $22.00 Birmingham basis, with a difference of one dollar per ton between the grades under No. 2 foundry. Northern iron for second quarter is nominal at $22.00 to $23.00 at furnace.

For last half delivery northern iron is quoted at $21.00 to $22.00 at furnace with $21.00 to $21.50 the most frequently quoted prices. Southern iron is on the basis of $18.50 Birmingham with some furnaces holding for $19.00, but there are few sales at the higher figure. We quote for last half delivery, delivered Cincinnati, as follows:

Southern Foundry No. 1	$22.00 to 22.50
Southern Foundry No. 2	21.50 to 22.00
Southern Foundry No. 3	21.00 to 21.50
Southern Foundry No. 4	20.50 to 21.00
Southern Foundry No. 1, soft	22.00 to 22.50
Southern Foundry No. 2, soft	21.50 to 22.00
Gray Forge	20.00 to 20.50
Northern Foundry No. 1	22.65 to 23.15
Northern Foundry No. 2	22.15 to 22.65
Northern Foundry No. 3	21.65 to 22.15
Jackson County Silvery, 3 per cent	30.15 to 31.15

Finished Material.—Bar iron in a wholesale way is strong and specification on contracts are good. Retail business is fairly active and prices are well maintained. Retail prices for filling orders here are as follows:

Angles 3 x 3 and over, 2.15c to 2.25c; beams and channels 15 inches and under 2.15c; small angles and architectural channels, 2.10c base; plates ¼ inch and heavier, 2c; 3-16 inch, 2.10c; No. 8, 2.10c; sheets (blue annealed) No. 10, 2.15c; No. 12, 2.20c; No. 14, 2.25c; No. 16, 2.35c; box annealed sheets Nos. 18 and 20, 2.50c; Nos. 22 and 24, 2.60c; Nos. 25 and 26, 2.65c; No. 27, 2.70c, and No. 28, 2.80c. Iron and steel bars 1.95c base; boiler tubes, 6 per cent off base; turn buckles, 45 per cent off; rivets, 3.15c base; cold rolled shafting 45 per cent off list; steel tire, 2.10c base.

Coke.—The movement of coke has been interfered with on account of weather and flood. There is not much spot coke offering. Prices are unchanged. There is some contracting for forward delivery, but business in this branch is not active. Prices in the leading coke producing districts are as follows:

Wise County, Va. Furnace Coke prompt shipment	$3.25 to 3.50 per ton
Wise County, Va. Foundry Coke	4.00 to 4.50 per ton
Pocahontas Furnace Coke prompt shipment	3.25 to 3.50 per ton
Pocahontas Foundry Coke	3.50 to 4.00 per ton
Connellsville Furnace Coke prompt shipment	3.25 to 3.50 per ton
Connellsville Foundry Coke	4.15 to 4.50 per ton
New River Foundry Coke on contracts	3.50 to 4.00 per ton
New River Furnace Coke, prompt shipment	2.75 to 3.00 per ton

†Wise County, Va., Coke on Furnace contracts is sold mainly on a sliding scale basis for pig iron prices on the following basis: $1.70 to $1.75 per ton on $9.00 pig iron, plus 19 to 20 per cent of the advance on pig iron above $9.00 Birmingham.

Old Material.—The market is easy in tone and there is less inclination on the part of melters to make purchases. We quote f. o. b. Cincinnati, as follows:

Old No. 1 railroad wrought, net tons	$18.00 to 18.50
Cast machine and foundry, net tons	18.00 to 18.50
Old iron rails, gross tons	25.00 to 26.00
Old steel rails, gross tons	18.50 to 19.00
Old short lengths, gross tons	18.00 to 18.50
Old iron axles, net tons	25.00 to 26.00
Heavy melting scrap, gross ton	20.00 to 21.00
Stove plate, net tons	14.00 to 14.50
Wrought turnings, net tons	12.00 to 12.50
Cast borings, net tons	9.00 to 9.50
Car wheels, gross tons	20.50 to 21.00

PHILADELPHIA.

Belated Buyers of Pig Iron are Having Their Troubles.—Rumors of Freight Advances.

February 5.

Pig Iron.—Those consumers of pig iron who have refused to believe in the permanence of the present high prices are now confronted with the situation that has been long predicted. With the exception of the foreign iron which steadily dribbles in, there is almost no iron to be had during the first half, and producers, many of whom are admittedly far behind in deliveries, are driven almost distracted by the appeals of consumers for supplies sufficient to keep their plants going. These include not only small foundrymen, but steel mills as well, and it is evident that many establishments are in really serious plight. To add to the perplexities of the situation, winter is here at last in earnest, and the entire east is now wrapped in heavy snow, which must necessarily have some effect upon railroad transportation. This had already become unsatisfactory because of the car shortage, which has recently been more acutely felt in eastern territory. To add further agony to these difficulties, there is a disquieting rumor that the railroads are contemplating a serious increase in rates, averaging about 10 per cent on soft coal, iron ore, coke, iron and steel, to go into effect on April 1. As 30 days' notice of such an advance must be given to the Interstate Commerce Commission, the truth or falsity of the report will soon be known. The railroads, it is said, justify their proposed action by the higher price they have to pay for supplies and labor and also by the greatly increased figures the blast furnaces are getting for their product. Taken in connection with the increased rates on anthracite to which reference was made last week, it is not surprising that such an array of unfavorable factors has forced prices for spot or first half deliveries up to top-notch figures. Some of those quoted in the last few days are $28 for No. 2X foundry, $23.30 for standard gray forge, $24.85 at the furnace for basic for nearby delivery, and $28.50 for low phosphorus.

In the last half of the year, especially the last quarter, quotations show the variations natural to individual judgments as to what the conditions are likely to be so far in the future. Some furnaces are inclined to make liberal concessions, while others are as firm as a rock in demanding the standard fixed by them. Some good sales have been made during the past week, and the market may be described as firm. In some quarters No. 2X may still be bought for the last half at $23.75, while other producers demand at least $1 more. Prices, which show little change, may be quoted as follows for that period:

No. 1X Foundry	$26.50 to 27.00
No. 2X Foundry	23.75 to 24.75
No. 2 Plain	23.25 to 23.75
Standard Gray Forge	22.80 to 23.00
Basic	23.50 to 24.00
Low Phosphorus	27.00 to 27.50

New Material.—Plates and structural material are the leaders in demand, but the market is strong in all lines and shows every sign of continuing so for many months to come. The railroad buying has been especially good. Prices, which show no change, may be quoted as follows: Beams, channels and angles according to specifications, 1.83½c to 2c; refined iron bars, 1.89½c to 1.93½c; steel bars, 1.83½c to 1.88½c; plates, 2.13½c to 2.18½c.

Old Material.—The market is spotty, weak at some points and in others sustained by the demands for steel scrap from foundrymen unable to get all the pig iron they need. Prices may be quoted as follows:

Old steel rails	$19.50 to 20.00
No. 1 steel scrap	18.00 to 18.50
Old steel axles	22.00 to 22.50
Old iron axles	30.00 to 31.00
Old iron rails	26.50 to 27.00
Old car wheels	22.00 to 22.50
Choice scrap, R. R. No. 1 wrought	22.00 to 22.50
No. 1 yard scrap	19.00 to 19.50
Machinery scrap	22.00 to 22.50
Low phosphorus scrap	22.50 to 23.00
Wrought iron pipe	16.00 to 16.50
No. 1 forge fire scrap	16.25 to 16.75
No. 2 forge fire scrap, ordinary	11.50 to 12.00
Wrought turnings	16.00 to 16.50
Axle turnings, heavy	16.80 to 17.00
Cast borings	13.50 to 14.25
Stove Plates	16.75 to 17.25

NEW YORK.

Chief Interest is in Foreign Iron and Its Effect on the Market.

Office of THE IRON TRADE REVIEW, Room 1315, No. 150 NASSAU ST., Feb. 5

Pig Iron.—Interest is centered in this district in early arrivals of foreign iron and in what proportion of the incoming tonnage is as yet unsold. Careful estimates are that February and March will see the arrival of between 30,000 and 50,000 tons of British iron at the principal North Atlantic ports. As much as 90 per cent of this iron, it is stated, was originally engaged on a speculative basis, though in large part it has been placed since that time and several importing interests state that all of their forthcoming iron has been disposed of. Since the recent extensive import movements began, an aggregate of about 100,000 tons has been landed and taken by

consumers; in comparison, the movement of this month and next will not be great and the unsold tonnage relatively insignificant. Still, it is an axiom that the surplus is what breaks the market, and consequently spot iron in the east is practically certain to rule easy and probably will sag considerably for a time. During the past week both spot and early delivery iron has been quiet, with the volume of business small. For third quarter and second half iron, however, prices continue firm. Recently circulated bearish reports have had the effect of causing prospective buyers to hold off and considerable current inquiry has been made with the idea of sounding the market. These inquiries have developed no willingness on the part of selling interests to shade present quotations, and except for a slight hesitancy there is no indication of weakness. A sale of 1,200 tons of Virginia foundry is reported at $22.50 for second half delivery and other small lots have been closed. There is a good demand for high silicon, with prices firm. Selling concerns report the volume of January business as fully up to the average. Spot Lehigh Valley foundry is selling at $25.00 to $26.00.

Tidewater prices for second half delivery are as follows:

Northern Foundry No. 1	$24.00 to 25.00
No. 2 Foundry	23.50 to 24.50
No. 2 Plain	23.00 to 24.00
No. 1 Southern Foundry	22.50 to 23.00
No. 2 Southern Foundry	22.00 to 23.00
No. 3 Southern Foundry	21.50 to 22.00
No. 4 Southern Foundry	21.00 to 22.00

Finished Materials.—Quiet continues in all lines, the volume of current business being light, though prospective orders, chiefly held up because of the tight money market, will call for good tonnages. The plate demand in this district is not large. Billet activity is decreased and the market is now about $31.50. Steel bars are firm and a considerable tonnage of bar iron has been placed during the week, 3,000 tons being closed in one lot for delivery through the spring. The full market price is being secured for current orders, and ample business is pending.

In spite of the great volume of deferred business the orders closed by the American Bridge Co. during January totaled 52,000 tons, about the average of recent months. This includes about 15,000 tons for the Corn Products Co. February bookings have not been extensive. The Carnegie Steel Co. has closed for about 1,300 tons for constructive purposes, the Delaware & Hudson has taken 1,400 tons for bridge purposes, and several western electric lines have contracted for good sized lots. Considerable business has gone to outside interests, Jones & Laughlin securing contracts for 500 tons for a Pittsburg building. Railways have been active buyers, the Norfolk & Western closing for 3,000 tons, the St. Paul for a like amount, divided among several mills, and the Pennsylvania system for 1,400 tons. Besides these a number of smaller orders were placed. No New York building operations have been closed during the week.

The following are prices at tidewater: Angles 3 to 6 inches x ¼ inch and heavier, 1.84½c; beams, 3 to 15 inches, 1.84½c; tees, 3 x ¼ inch and heavier, 1.89½c; plates, carloads, tank, 1.94½c; flange, 1.94½c; marine boiler, 2.14½c; refined iron bars, 1.84½c to 1.89½c; soft steel bars, 1.74½c to 1.84½c; sheets, No. 28 black, 2.60c.

Old Materials.—The market is without strengthening features and the tendency is downward, though trading is so light that quotations are not appreciably lower. We quote tidewater prices as follows:

Old iron rails	$24.00 to 25.00
Old steel rails, long lengths	20.00 to 21.00
Old steel rails, short pieces	18.50 to 19.00
Relaying rails	28.00 to 29.00
Old car wheels	22.00 to 22.50
Old iron car axles	28.50 to 29.50
Old steel car axles	21.00 to 21.50
Heavy melting steel scrap	17.50 to 18.00
No. 1 railroad wrought scrap	20.50 to 21.00
Iron track scrap	18.00 to 18.50
Wrought pipe	15.00 to 15.50
Cast borings	11.50 to 12.00
Wrought turnings	15.00 to 15.50
Heavy Cast Scrap	18.50 to 19.00

BUFFALO.

Less Active Buying, But Prices of Pig Iron are Firm.

February 4.

Pig Iron.—The market continues steady with firm prices and a strong demand. It is generally stated that there are no indications of a change in prices, one way or another, in the immediate future. Inquiries for third quarter are more numerous, but sales have not been quite as large the past week as they were the several weeks previous. Third quarter iron is pretty well disposed of and the business for the next few weeks will be chiefly for fourth quarter delivery.

Conditions generally are settling down into a more normal basis than that which has characterized the market for months past. While business has shown no signs of depression, buyers are not so active.

Representatives of furnaces in the Birmingham district have received notices from the railroads that freight tariffs will be advanced 25 cents a ton March 2. They are governing themselves accordingly in making contracts. This is the second advance of 25 cents to points in this territory, the first being made March 1, 1906. The present rate on southern to Buffalo is $4.65; so the advanced rate will be $4.90. For many years southern was shipped to Buffalo points for $4.40.

As a result of a more stable condition of the market here, quotations for last half delivery iron show smaller margin between the minimum and maximum prices. We quote for last half delivery as follows:

No. 1 X Foundry	$22.75 to 23.25
No. 2 X Foundry	22.25 to 22.75
No. 3 Foundry	21.50 to 22.00
No. 2 Plain	22.00 to 22.50
Malleable Bessemer	22.50 to 23.00
Gray Forge	21.50 to 22.00
Charcoal	26.00 to 27.00

ST. LOUIS.

Pig Iron Prices Stationary, but Tendency Toward Weakness Noted.

February 4.

Pig Iron.—Consumers and agents alike were pleased with the action of the railroads in deferring one month the date on which the advance on pig iron to points south of the Ohio river will go into effect. St. Louis is classed with points south of the river and therefore the advance of 25 cents will not take effect until March 3. This action does not effect points further north, where the advance already has gone into effect. Consumers are chiefly delighted as it will give them a chance to get iron they contracted for months ago under the old freight rate.

Orders continued in fair volume during the week just closed with prices at last week's quotations, but there is a slight tendency toward weakness. Southern No. 2 is selling at $23 Birmingham basis for spot, $21 and $22 for second quarter and $18.50 for last half, though there are reports of $18 being done for last half. One of the malleable companies bought 1,200 tons of southern malleable and is still in the market for 3,200 tons. Another malleable concern is inquiring for 3,000 tons of malleable for second quarter and last half.

A leading car interest which has twice put out inquiries for a large tonnage without procuring iron upon its terms has again addressed itself to the agents. Despite the attractiveness of the large tonnage, the furnaces have refused to close at the terms offered. Charcoal iron is not offered for sale, what little there is in sight being under contract.

Iron quotations for the first quarter, including the new freight rate of $3.75 (which goes into effect March 3) range as follows:

Southern No. 1	$26.75 to 27.25
Southern No. 2	26.25 to 26.75
Southern No. 3	25.25 to 26.25
Southern No. 4	24.25 to 25.25
Gray Forge	23.75 to 24.75

Coke.—On account of the tie-up of traffic by the Ohio flood, coke is a little stiffer this week. Sales were moderately good on a basis of $4.10 to $4.35 Connellsville.

Finished Material.—Demand for structural shapes is rather brisk. The contract for the beams for the Lauran building, about 700 tons, went to Nolker & Richards, of Indianapolis. The angles, elbows, etc., will be bought from shop here.

BIRMINGHAM.

Action on Freight Rates Gives Satisfaction.—Steady Inquiry for Iron.

February 4.

A postponement for thirty-one days from Feb. 1 of the advance in freight rates on pig iron and kindred products of twenty-five cents per ton, has caused satisfaction in the southern iron and steel market. Efforts are again being made to move out as much iron and steel as possible during the month, though short it is two days. The announcement was made by the larger transportation companies that application had been made to the Interstate Commerce Commission to extend the time for the advance in freight rates to go into effect and that a favorable reply had been given. The railroads are furnishing more cars in the southern territory and from all sections of the district come reports that there is a better movement and that the consumers will shortly be in possession of a large portion of their iron ordered weeks ago. The accumulated iron will be worked on persistently and the railroads promise to give every accommodation possible during the coming four weeks.

There is still a steady inquiry for iron for delivery during the last half of the year. No iron is being sold now for delivery at any time in 1907 under $18 to $18.50 per ton No. 2 foundry. Positively the utmost confidence is expressed by the southern manufacturers that there is going to be need for every ton of iron that can be manufactured. That the furnace companies have confidence in the strength of the market is evidenced in the fact that every preparation is being made to increase the output. For instance, some of the furnace companies have recently made contracts with ore mining companies for the entire year's output at the mines. Others have taken up the work of development in their own properties, in both coal and ore, while still others have closed contracts for coal and coke during 1907. A large number of men are being given employment in the southern territory on furnaces and the work is being rushed. Seven furnaces are being repaired in Alabama, with an eighth one about to be put in the hands of a repairing force. Positively every ton of iron that can be manufactured this year will be produced and there is no apprehension as to a demand being ready to take it up.

Steel operations in Alabama are only interfered with by necessary repairing of machinery. At the big steel plant one or two of the departments lost some time through some necessary work being done. The plants are all in full operation again and the demand for the various products is strong, with prices most satisfactory.

SOME WEAKNESS

Appears in the British Pig Iron Market.—Withdrawals From Stores.

Office of THE IRON TRADE REVIEW.
Prince's Chambers, Corporation Street,
Birmingham, Eng., Jan. 23.

There has been some little weakness in pig iron during the past week, the quotation for warrants having fallen about 1s 9d on the week. This has happened in spite of record shipments for January and renewed inquiries and some fresh business for America and the continent. One influential element has been the report of half a dollar decline in American iron. It is remarkable that there have been heavier withdrawals from the Cleveland warrant stores during the month than for a long time past, largely owing to American shipments. The latest quotations for Cleveland iron are from £2 19s 4½d ($14.26) to £2 19s 2½d cash ($14.14). £3 0s 1½d ($14.44) to £2 19s 9d ($14.35) for one month. Stores at Middlesboro' are reducing at about 1,000 tons per day. There are 35 furnaces in blast in the Barrow district, thirty-one of which are producing hematite and the rest ferromanganese, and other special sorts. Very little actual business is being done owing to the slight falling in price, and the market is much disturbed. But there is a general agreement that prices do not fairly represent the state of trade, and that an early recovery is inevitable. The stores at Middlesboro' now amount to 516,663 tons, and at Glasgow (Scotch) 5,254, other makes 4,000, and hematite west coast, 79,665 tons.

Metal Market

NEW YORK.

February 4.

Copper.—Transportation difficulties in the west have interfered greatly with shipments of copper and great amounts of electrolytic are tied up between Montana and Chicago. The foreign supply is steadily decreasing and prices abroad are tending upward. Prime lake sold Monday in the local market for 25⅝c, May shipment, with electrolytic for April and May at 24½c. Casting copper is in demand at 24½c. Exports since Feb. 1 have been less than 350 tons, with imports considerable.

Pig Tin.—For spot or early shipment the supply is light, prices ranging 42c to 42½c. There has been a sharp advance in foreign markets, resulting in a slight sympathetic advance in this district. London closed Monday at £193 for spot and £192 5s for futures.

Pig Lead.—The demand is good, and prices are firmer, spot being quoted at 6.25c to 6.30c in car lots. Soft Missouri brands are held at 6.10c and special brands at 6.12c. Soft Spanish brands are lower, London closing Monday at £19 13s 9d.

Spelter.—The market is firm and quiet, spot offering being made at 6.80c to 6.85c in car lots. Western for spot and February at 6.70c in car lots. London closed Monday at £26 10s.

Antimony.—The demand is moderate. Cookson's is held at 25c to 25½c, Hallett's at 24c to 24½c. Ordinary salable brands bring 23¼c to 24¾c.

CHICAGO.

February 4.

Demand continues in good volume. Copper is selling more freely than of late, and 26¾c for casting, and 27c for lake, the market is very firm. Pig tin is unchanged at 44¾c and spelter at 7c. Lead is moving freely, desilverized being firm at 6.50c to 6.60c for 50-ton lots, and corroding at 7.25c to 7.35c. Carload lots are 2¼c per 100 pounds higher. Sheet zinc is in good demand at 8.40c LaSalle in car lots of 600-pound casks. Antimony is without change at 28½c for Cookson's, and 26½c for other grades.

Demand for old metals is easier in sympathy with the market on iron and steel scrap. Prices, however, are without noticeable change. We quote dealers' buying prices, as follows:

Copper wire, 21c; heavy copper, 20½c; copper bottoms, 19¾c; copper clips, 20c; red brass, 19¾c; red brass borings, 16½c; yellow brass, 16¼c; yellow brass borings, 14½c; light brass, 13c; lead pipe, 5.50c; tea lead, 5c; zinc, 5c; pewter No. 1, 28c; tin foil, 34c; block tin pipe, 27¾c.

ST. LOUIS.

February 4.

Spelter is firm and in demand. It is quoted today at $6.70 to $6.75 with the inclination to hold for the higher figure.

Lead is quet but firm. Missouri brands are quoted at $6.10 while special noncorroding is salable at $6.20.

On spirited bidding both zinc and lead ores were advanced in the Missouri-Kansas field.

Catalogs Wanted. — The Edison Electric Illuminating Co., 360 Pearl St., Brooklyn, requests manufacturers to mail their latest catalogs for its purchasing department files.

REPUBLIC-TENNESSEE DIRECTORS

Look Over the Alabama Properties.—Alabama Consolidated Changes.

Birmingham, Ala., Feb. 4.—The directors of the Republic-Tennessee companies, Messrs. John W. Gates, L. C. Hanna, E. W. Oglebay, John A. Topping, G. W. French and Grant C. Schley, held several meetings in the general offices of the company in Birmingham during the past week. The officials also visited Ensley, the steel center in Alabama, and other places and viewed the big development under way by the large southern industrial corporation. While it is known that the directors believe in big development of the properties and further enlargement of its capacities, even going so far as to acquire other properties, nothing definite was given out after the directors had left Birmingham. Mr. Topping is still in Birmingham and is giving matters on which he has been working for some time his strictest attention. The Republic-Tennessee companies are now engaged in making some extensive betterments of properties in the Birmingham district and at the same time developing. The erection of a steel plant is but one of the plans under way by these companies. It is estimated that no less than $7,000,000 will have been expended before the plans adopted some time ago have been carried out.

Changes in the Alabama Consolidated.

Several changes with the Alabama Consolidated Coal & Iron Co. have been announced. Guy Johnson is vice president and general manager in charge. M. W. Bush is assistant to the president. H. Hammond, who was assistant to the president and general sales agent, has resigned and with William Byrd has formed an iron brokerage firm. Mr. Hammond will retain his interests in the Coosa Pipe & Foundry Co. and Imperial Coal & Coke Co. He will also continue to act as sales agent for the Shelby Iron Co., which concern will be by the end of the week manufacturing charcoal iron again. J. G. Thompson has resigned as superintendent of the Ironaton furnaces to accept position with the Woodstock Iron Co., and he is succeeded by J. Banks Hudson, who comes to this territory from Virginia.

The Birmingham Car & Manufacturing Co., recently organized by C. Ellis Foust and associates, capital stock $100,000, will shortly begin the erection of a plant to manufacture small cars and car wheels at North Birmingham.

J. S. Ralston, president of the Ralston Steel Car Co., Columbus, O., has returned from an extended business trip through the south.

PIG IRON PRODUCTION.

Heavy Increase in the United States and Canada Last Year.

Philadelphia, Feb. 4.—Complete reports received from every iron furnace in the country by the American Iron and Steel Association show that the total production of all kinds of pig iron throughout the United States in 1906 was 25,307,191 gross tons, against 22,992,380 tons in 1905. The production in the second half of 1906 was 142,691 tons greater than in the first half.

The whole number of furnaces in blast on December 31, 1906, was 340, against 323 on June 30, 1906, and 313 on December 31, 1905. The number of furnaces in blast at the end of 1906 was larger than at the close of any year since 1889, when 344 furnaces were active. At the close of 1906 there were 89 idle furnaces, as compared with 111 at the end of 1905.

The total production of pig iron of all kinds in Canada in 1906 was 541,957 tons, an increase of 73,954 tons over 1905. Of the 15 completed blast furnaces in Canada 8 were in blast at the end of the year.

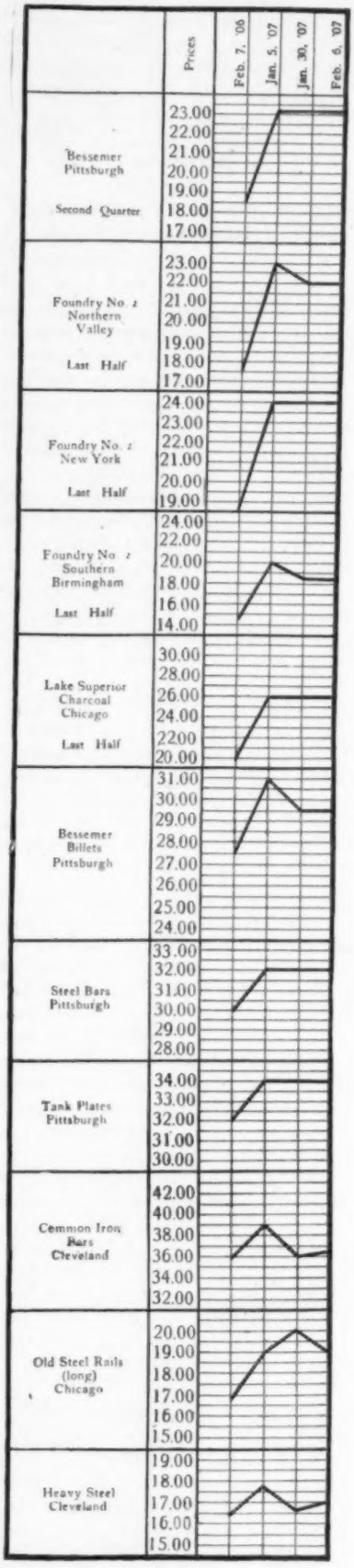
AMERICAN CAN CO. REPORT.

New York, Feb. 6.—At the annual meeting of the American Can Co. held Tuesday the old board of directors was continued. The annual report of President Graham showed net earnings of $2,534,367 for the year 1906, comparing with practically the same amount for the last nine months of 1905, the fiscal year having been changed. During the year three Pacific coast plants and one at St. Paul were destroyed by fire, deductions for fire loss being about a quarter million. Net profits for the year were $2,113,421. The outlook for business is pronounced entirely favorable.

PITTSBURG FOUNDRYMEN'S ASSOCIATION.

Molding machines of the squeezer, vibrator, roll-over and jarring types were shown in operation at the monthly meeting of the Pittsburg Foundrymen's Association, held at the Carnegie Technical Schools, Pittsburg, Monday, Feb. 4. The machines were exhibited in the school foundry, which is a commodious building where the rudiments of molding are taught. The attendance of foundrymen, which was large, was augmented by the presence of a large number of students, who manifested great interest in the operation of these machines. After the exhibition the visitors were conducted on an inspection tour through the schools.

PRICE CHART.


Prices
Feb. 7, '06
Jan. 5, '07
Jan. 30, '07
Feb. 6, '07
Bessemer Pittsburgh Second Quarter
23.00 22.00 21.00 20.00 19.00 18.00 17.00
Foundry No. 2 Northern Valley Last Half
23.00 22.00 21.00 20.00 19.00 18.00 17.00
Foundry No. 2 New York Last Half
24.00 23.00 22.00 21.00 20.00 19.00
Foundry No. 2 Southern Birmingham Last Half
24.00 22.00 20.00 18.00 16.00 14.00
Lake Superior Charcoal Chicago Last Half
30.00 28.00 26.00 24.00 22.00 20.00
Bessemer Billets Pittsburgh
31.00 30.00 29.00 28.00 27.00 26.00 25.00 24.00
Steel Bars Pittsburgh
33.00 32.00 31.00 30.00 29.00 28.00
Tank Plates Pittsburgh
34.00 33.00 32.00 31.00 30.00
Common Iron Bars Cleveland
42.00 40.00 38.00 36.00 34.00 32.00
Old Steel Rails (long) Chicago
20.00 19.00 18.00 17.00 16.00 15.00
Heavy Steel Cleveland
19.00 18.00 17.00 16.00 15.00

PERSONALS.

Frank Flickinger has become manager of the Buckeye Wheel Co., Galion, O.

W. A. Thomas has been elected president and C. G. Thomas secretary and treasurer by the directors of the Niles Iron & Sheet Co., Niles, O.

Dwight W. Grover has resigned as vice president and Charles Lockwood as treasurer of the Keystone Emery Mills, Frankford, Philadelphia, Pa., effective Feb. 1.

Fred G. Roller, formerly with the Penn Steel Casting Co., Chester, Pa., and the Bateman Mfg. Co., of Grenloch, N. J., has accepted the position of superintendent of the Belmont Iron Works, Philadelphia.

C. W. Trowbridge, until last week contracting manager at St. Louis for the American Bridge Co., has been transferred to a like position in the structural department at Chicago. Edward E. Green, late of the Minneapolis office, succeeds Mr. Trowbridge at St. Louis.

L. M. Hartzell has been appointed superintendent of the Bessemer mills of the Homestead steel works to succeed E. G. Weisener, who has been made manager of the mills of the Carnegie Steel Co. at Bellaire, Steubenville and Mingo Junction, O. Mr. Hartzell was formerly Superintendent Weisener's assistant.

William H. Lewis, the retiring general superintendent of the plants of the Carnegie Steel Co., at Sharon and South Sharon, recently tendered a banquet at Sharon to superintendents, heads of departments and other representatives of the Carnegie company. About 175 guests attended. Mr. Lewis is now general manager of the new Jones & Laughlin Steel Co.'s plant at Aliquippa, Pa.

C. L. Benjamin, first editor of *Printers' Ink*, has been engaged to take charge of the publicity department of the Cutler-Hammer Co., Milwaukee, Wis. Ellis B. Usher, ex-Washington correspondent for Milwaukee papers, and one of the best known Wisconsin newspaper men, has been engaged by the Allis-Chalmers Co. to care for the newspaper end of its publicity work. There will be no change in the publicity department of the company as previously organized.

The condition of W. C. McMillan, president of the Michigan Malleable Iron Co., who is ill at his home in Detroit, has undergone a change for the worse in the past week, but the latest report from his bedside is that he is again resting quietly. Mr. McMillan's uncle, Hugh McMillan, who was associated with the former's father, Senator McMillan, in the Michigan Car Co., and the Detroit Car Wheel Co., is also very ill at the present time, suffering from diabetes.

DEATH OF JOSEPH FLATHER.

Joseph Flather, of Nashua, N. H., and a widely known manufacturer of machine tools, died in that city on Feb. 4 of pneumonia. A former president of the National Machine Tool Builders' Association, he was at the head of one of the largest industries in that state, an enterprise by the way that was established by him and his brother away back in 1867.

Mr. Flather was born in Bradford, England, in 1837. He became an apprentice there to the trade of a machinist and on coming to this country he followed that occupation in a number of cities. The diversity of work thus studied gave him an intimate acquaintance with current shop practice in the United States, and he built upon his English training a structure that stood strong and sure during his later very successful progress. Finally he located in Nashua and began the manufacture of planers and other machine tools. His firm built up a substantial export trade in addition to the regularly increasing business at home and he took a leading part in the section of American exhibits at the last exposition in Paris.

A citizen with due pride and concern in all civic affairs, he had an active and helpful interest in local as well as national advancement. He served in the common council, the board of aldermen, the legislature and the board of education. He was president of the last named organization. But as a business man of broad gage interests and as a machinist of ability he will be best remembered among those in touch with metal-working pursuits. At the convention of the craft that it was his delight to attend, the lack of his cheery presence and genial greeting will be greatly regretted.

DEATH OF JOHN PHILLIPS.

John Phillips, one of Pittsburg's pioneer iron manufacturers and a man long identified with the industrial interests of that city, died at his home at Carrick, Jan. 29, from general debility. Mr. Phillips was born Jan. 30, 1822, and in his early years learned brick laying. Later he formed a co-partnership with his brother, James, in the building and contracting business. In 1860 in conjunction with William J. Lewis, who had invented a machine for making bolts, he established a bolt manufacturing plant in Pittsburg. In 1863 the late Henry W. Oliver became a partner, changing the firm to Lewis, Oliver & Phillips. Upon Mr. Lewis' retirement from the firm, it was named Oliver Brothers & Phillips, which later gave way to the Oliver Iron & Steel Co., of which Mr. Phillips was president. The mine supply department of this enterprise was bought by Mr. Phillips and his nephew, John M. Phillips, and was established in a separate plant. When the former retired from all active business in 1900, the concern was incorporated as the Phillips Mine & Mill Supply Co. A fondness for outdoor life was one of Mr. Phillips' characteristics. Many years ago he had a wagon built for hunting trips and he would often spend two or three weeks at a time hunting in the surrounding country. Six years ago, his health began to fail and for the past four years, he has been confined closely to his house and grounds. He leaves a widow and five daughters.

OBITUARIES.

Henry Clark Sergeant of the Ingersoll-Sergeant Co., now an integral part of the Ingersoll-Rand Co., died of paralysis at his home, Westfield, N. J., Jan. 30. An extended account of his life will appear in THE IRON TRADE REVIEW next week.

John Osgood, a pioneer iron manufacturer of New York state, died Jan. 31 at his home in New York City. Mr. Osgood was 89 years of age and was a native of Canada, early learning the trade of an iron molder in Vermont. Later he removed to Fort Edward, where he founded and for forty years maintained an extensive plant.

Edward Armstrong, night superintendent of the Black Diamond works of the Crucible Steel Co., Pittsburg, Pa., died Feb. 1 from acute peritonitis superinduced by an accidental fall while on duty. He was 56 years of age. Mr. Armstrong was an acknowledged authority on the making of crucible steel and was the inventor of several labor saving devices and processes now in general use.

Thomas S. B. Wood, aged 45, of Sharon, Pa., died in the hospital of the University of Pennsylvania in Philadelphia, Jan 28, from pulmonary trouble. He was the son of the late Charles Wood, of Pittsburg, who was associated with James W. Friend in the iron business, and who established the Wood rolling mill at Wheatland, Pa. The son at one time was superintendent of the mill, but lately he had been conducting a general store and real estate business.

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PREPARATION FOR PLANT INTERRUPTIONS.

Characteristic of American energy and foresight in the manufacturing field is the rapidity with which it is able to overcome the unexpected interruption of producing ability, by reason of either accident or fire. It is noteworthy that only insignificant delays in shipments are now occasioned by misfortunes of such moment that their occurrence a decade ago would have meant a long paralysis of activity. Less than a fortnight ago, to illustrate, the Baldwin Locomotive Works at Philadelphia were visited by a fire which destroyed important departments and wrought damage estimated at about half a million dollars. Before the ruins of the great building were cool, arrangements had been completed whereby the work carried on in the departments destroyed was transferred and distributed about the plant, reducing to a minimum the delay in completing pressing orders, and plans were under way for rebuilding.

This is cited because it is a typical case, not an exception. The past year has furnished many similar instances of extensive fires and other catastrophes, the effect of which has scarcely been felt at all by the consuming public. Preparation for sudden and sweeping interruptions of this sort has come to be recognized as an essential in plant management. Naturally, in the planning of new factories the tendency is to render them as nearly fireproof as circumstances will permit, and in many buildings recently constructed this has been arrived at absolutely. This in itself furnishes practically all that is necessary in the way of protection against fire, and the multiplicity of safeguarding devices has served to a great extent to reduce the possibility of serious accidents. The bulk of manufacturing, however, is not being done in what can be called "strictly modern" shops possessing the fireproof feature, and the necessity of being prepared constantly for rapid recuperation from fire is second in importance only to the necessity of precaution against fire.

This is being accomplished with steadily increasing ease. If it is only a machine shop or foundry that is destroyed, new equipment is readily procured, if indeed a part of it is not already on hand for emergencies, connections with the central power plant are quickly made, individual motors permit the operation of machine tools at any spot where floor space is available, thus doing away with the limitations imposed by the line shaft system of driving, and in the crudest of temporary structures activities can be resumed. The replacement of patterns is always a serious and tedius task, as pattern storage rooms of fireproof construction and separated from other sections of the plant attest. But with this precaution taken and an ordinary amount of foresight employed in anticipating the most trying difficulties of the possible emergency, the average plant should lose but little time as the result of its partial destruction.

The furnace operator usually has some intimation of impending trouble. If a stack has been hard driven over a considerable period, he knows that it must soon be blown out for relining, and can accumulate materials in anticipation. The machine shop, the foundry or other iron-working plant, however, is always liable to misfortune, and the manufacturer who, recognizing this fact, occasionally looks ahead and is ready for the emergency is the one who will suffer least when difficulties come.

STEADILY GROWING WIRE EXPORTS.

One of the earliest export lines cultivated in the steel trade was that of wire, and the statistics of exports during the calendar year 1906 add another year to the steady growth. Grouping plain wire and wire nails, the following is the export record in quotations for the past six years: 1901, 107,010; 1902, 124,423; 1903, 140,017; 1904, 151,404; 1905, 178,311; 1906, 220,250.

The wire trade is distinctly one which must be built up. Large tonnage orders cannot be accepted or refused at will, as is the case with rails and crude steel. Of necessity the mills have fostered this trade in the best times, and in times that were less good. Rails dwindled to negligible proportions, 30,656 tons in 1903, when domestic demand was good, and reached record proportions, 414,845 tons in 1904, when domestic demand was very poor. Exports of billets and sheet bars have shown almost as great variation.

Throughout our iron and steel exports it is to be observed that our exports are heaviest in those lines where the replacement of manual labor by machinery has been most extensive, and this accounts for the profitableness of the export trade in wire.

ANOTHER PIG IRON RECORD.

The appearance of the official returns of pig iron production in 1906, showing a total of 25,307,191 gross tons, deserves passing mention, although it has been well known since the beginning of that year that it would break all previous records, while it has also been known for some time that the total would pass well above the 25,000,000 ton mark.

The increase over 1905 is about 2,300,000 tons, or almost exactly 10 per cent, while the increase in nine years has been 160 per cent, although 1897, despite the fact that it showed the lowest priced pig iron in the history of the American iron trade, was itself a record breaker in point of tonnage. But one year since then, the year 1904, has failed to break all previous records, and it is absolutely certain that, barring some unparalleled disaster, the current year will add another to the string of record breakers. It is too early to make defi-

nite predictions, but it can at least be said that it will be surprising if the year 1907 does not show a pig iron production in excess of 27,000,000 tons.

It has been a well established rule for years that the production of pig iron in the United States doubles on an average in a trifle less than 10 years, and the year 1906 bears out the rule. Half of its production was not made prior to 1899, one-fourth prior to 1887, one-eighth prior to 1880, or one-sixteenth prior to 1869. In other words, the production from 1868 (itself a record year) to 1906, a period of 38 years, has done a little better than double four times.

NEWS FROM THE BLAST FURNACES.

One of the five Eliza furnaces of the Jones & Laughlin Steel Co. was out of blast 22 days during January.

The Princess furnace, formerly operated by the Princess Iron Co., at Glen Wilton, Va., has been sold to Mathew Addy & Co.

The December run at the Goodrich furnace of the Standard Iron Co., Goodrich, Tenn., was the best that furnace has experienced during the present blast, which has been continuous for the past 33 months. The stack is 12 x 55 feet, with only one 50-pipe stove. With this equipment 1,745 tons of iron were made, running 99 per cent good iron, with an average coke consumption of 2,554 tons per pound of iron. The charge is made of Virginia coke with local Tennessee ore and limestone. R. B. Dowd is the superintendent of the furnace.

The Lookout Mountain Iron Co., formerly operating the Battelle furnace in Alabama, was purchased in November of last year by Charles H. Stephens, Cincinnati, O., at a sheriff's sale.

The Rockdale Iron Co. has its furnace out of blast for relining, and, at the same time, is making extensive improvements. It is expected that the furnace will be blown in by March 1.

One furnace of the Ashland Iron & Mining Co., at Ashand, Ky., was blown out for relining Jan. 15.

The Warwick Iron & Steel Co. has leased the Anvil furnace, previously operated by the Glasgow Iron Co., of Pottstown, Pa.

A number of changes in the personnel of the officers of the Central Iron & Coal Co. has brought to that concern from the Tennessee Coal, Iron & Railroad Co., J. W. Shook as vice president, J. L. Brierton, assistant to the vice president and purchasing agent, and F. B. McKenzie, furnace superintendent.

COKE PROPERTIES

ARE INVOLVED IN SEVERAL LARGE TRANSACTIONS.

Cleveland Syndicate Forms The Tower Hill Connellsville Coke Co.—Pickands-Magee Coke Co., Changes Name.

Large transactions in coal and coke properties have been the order of the past week. Principal among them has been the purchase of 2,000 acres of coal territory near Uniontown, Pa., by a syndicate of Cleveland capitalists, for $3,400,000, and the formation of the Tower Hill Connellsville Coke Co., with a capital stock of $1,500,000 preferred, $4,000,000 common, and $2,500,000 in bonds to develop the property. Arrangements are being made for the construction of 800 coke ovens which will be equipped with machines for drawing the product, making them among the most modern of the Pennsylvania coke region. The officers of the company are: George D. Howell, Uniontown, Pa., president; first vice president, F. M. Osborn, Cleveland; second vice president, J. V. Thompson, Uniontown; treasurer, Joseph R. Nutt, Cleveland; secretary and general manager, L. W. Fogg, Uniontown; assistant treasurer, John R. Thompson. Andrew Squires of Cleveland, George H. Burr of New York, and Lloyd G. McCrum are on the board of directors with the officers. A mortgage for $2,500,000 covering the property has been given by the new company to the Citizens' Saving & Trust Co., of Cleveland.

Buys Out Interest.

The Pickands-Magee Coke Co., 1367 Frick Annex building, Pittsburg, has changed its corporate name to the Pickands-Magee Co., and increased the capitalization from $100,000 to $200,000, all of which is paid in, and has also taken into the company several new interests in addition to buying out the interest of the Pickands-Brown Co., Chicago. The new organization now ranks fourth in the Connellsville coke region. Last year it controlled an output of 600,000 tons coke and 200,000 tons coal, and with the additions it expects to handle in 1907 at least 1,000,000 tons coke and 500,000 tons coal. Several of the smaller companies formerly controlled by the Pickands-Magee Coke Co. have been merged into the Southern Connellsville Coke Co., of which George Whyel of Uniontown is vice president and general manager, and this company, together with the Whyel Coke Co., controlled by George and Harry Whyel, is now a part of the Pickands-Magee Co., with both of these gentlemen, who are large operators, as directors. The Pickands-Brown Co., Chicago, will now devote itself entirely to the manufacture and sale of by-product coke manufactured at Milwaukee and South Chicago. The new officers of the Pickands-Magee Co. are W. C. Magee, president and treasurer; Harry Whyel, vice president; C. L. Boyle, secretary; C. S. Bygate, general sales agent. The new board of directors consists of the following: D. M. Clemson, Thomas Morrison, C. L. Doyle, all of Pittsburg; W. C. Magee, I. W. Semans, George Whyel and Harry Whyel of Uniontown.

PROTESTS EMPHATIC

And Advanced Freight Rate Will Not Becomes Effective Till March 3.

The proposition to advance freight rates on pig iron in the south, to take effect Feb. 1, was so vigorously opposed by the shipping interests that the railroads saw the injustice of putting the advance into effect on the date named, and, having obtained the consent of the Interstate Commerce Commission, have made the date for the new rate March 3. Many protests were filed with the Interstate Commerce Commission and with the railroads. One of the letters which, doubtless, had much effect, was addressed to the Southern railway and to the Louisville & Nashville railway, by Robert Field of Cincinnati, as the agent of numerous melters, who had requested him to lay the facts before the railroads. Mr. Field very clearly explained the injustice of charging an advanced freight rate on iron, the shipment of which had long been delayed, as contracts for the sale of pig iron are all based on the freight rate in effect at the time sales are made. Mr. Field served notice that if the rate should be placed in effect Feb. 1, he would oppose the advance to the limit of his legal rights, and would bring action in the United States courts or before the Interstate Commerce Commission in an effort to secure the justice which he knew to be due to the northern users of southern iron. In response to Mr. Field's letter, which was dated Jan. 28, J. M. Culp, second vice president of the Southern railway, wired as follows on Jan. 30:

"Have this morning your letter twenty-eighth. It has been determined, in view of extraordinary and unprecedented conditions of transportation and car supply affecting movement from furnaces of iron sold on old basis before notice of advance was given, some of which iron has not yet moved, that we should postpone advance in rates thirty days. Application accordingly will be filed this morning with Interstate Commerce Commission, whose authority is necessary to continue present rates in effect to and including March 2."

MANY SAFETY DEVICES

Exhibited at the New York Exposition.—Protection From Tuberculosis.

(Special Correspondence.)

New York, Feb. 1.—The protection of the workman is the key-note of the first International Exposition of Safety Devices and Industrial Hygiene which was thrown open to the public this week at the American Museum of Natural History, New York city, under the auspices of the American Institute of Social Service. The efforts of President Strong and Director Tolman have resulted in the preparation of exhibits by a large number of manufacturers and a wide range of unique products are shown. No restriction was imposed as to the nature of the exhibit, so long as the betterment of the working class was the prime consideration, and a varied collection of live models, safeguarded machines, preparations and outfits for ministering first aid to the injured and photographs of machines, model plants, hygienic lodgings, sanatoriums and the like is being viewed by throngs of visitors.

Foreign Photographs.

Groups of photographs loaned by permanent museums at Berlin, Amsterdam, Munich, Vienna and other European cities form a prominent part of the exposition. The methods employed abroad for the general improvement of the working class in the way of sanitary housing, industrial insurance, the reduction of alcoholism, aid societies, vacation societies, convalescent homes, Sunday closing, precautions against lead poisoning, nourishing food, etc., are described in an extensive collection of pamphlets and reports, and in most instances are illustrated with series of prints. This is one of the most interesting features of the exposition and, in case the hopes of the Institute to make this the beginning of a permanent museum are realized, one of the chief lines of effort will be the gathering of all available data on these and allied subjects with the idea of giving American manufactures ready access to what has been published. With but few exceptions, manufacturing concerns of the United States are not represented in this field of activity. It is not to be denied that wide attention has already been directed to betterment work in America and that many manufacturers have developed systems of originality and great practical value, but these for the most part are absent from the exposition. The founding of a permanent national museum will make possible the acculumation of a vast amount of valuable data from the experience of our own country in this connection.

One of the largest collections of photographs shown is that of the Westinghouse companies, the air-brake, electrical and manufacturing and Union Switch and Signal companies joining in their exhibit. The photographs in considerable part are of shop buildings and products, attention being paid to picturing various stages in the manufacture of some of the more complicated machines and devices. In this exhibit is shown a miniature model of the air brake, fitted to a couple of railway cars and so arranged that the coupling is accomplished, the air pipes joined and other attachments made automatically, the safety feature being that the railway employe is not, as formerly, forced to step between the cars to complete any process of the coupling.

Tuberculosis Safeguards.

The exhibit of the Brown & Sharpe Mfg. Co., Providence, R. I., also consisting principally of photographs, is noteworthy. There is a collection of the various notices posted about the plant, as warnings to employes and explaining the thorough campaign carried on by this company against tuberculosis. Whenever a workman is suspected of having contracted this disease he is subjected to a thorough examination by a physician employed by the company, the idea being that by beginning treatment in the early stages a cure can be effected. A feature is also made of the guards placed about the gears in the heavy machines turned out by this company and of placing the gearing inside the machine whenever this is practicable. Pipe systems for carrying off the dust from a buffing machine are shown, as well as specially designed lockers, wash basins and shower baths. An interesting device is a safety switch for foundry use where overhead tracks are employed, the device doing away with the danger of the truck from which the ladles are suspended running off the track when the switch is open.

Emery Wheel Protectors.

The problem of the rapidly revolving grinding wheel is of importance to the safety of the workman. The Norton Co., Worcester, Mass., exhibits a double alundum wheel protected against the possibility of damage in case of bursting by a heavy strip of steel slightly wider than the abrasive wheel. The steel band encircles the wheel except for about one-eighth of its circumference, where the actual work of grinding takes place. The Safety Emery Wheel Co., Springfield, Ohio, shows a unique emery wheel made with its sides convex. Over these are clamped concave steel plates of only a little smaller circumference. A 20-inch wheel of this type exhibited broke at 1,800 revolutions per minute, but the parts remained clamped between the plates and were not dislodged when the speed was increased to 2,150 revolutions.

The General Electric Co., Schenectady, N. Y., shows a sloping machine safeguarded. The New York Edison Co., New York, makes a feature of motor-driving of machine tools, so as to do away with overhead belting, and of protected gearing.

The Lunkenheimer Co., Cincinnati, manufacturing engineering specialties, exhibits a variety of fusible plugs. The H. & M. Valve Co., New York, presents its combination stop and isolating valve, the latter closing automatically in case of steam pipe fractures. Along the same line is the showing of the Northern Specialty Co., New York, a combination water gage and safety valve by which, in case of the gage glass breaking, the steam is immediately shut off, thus preventing the scalding of engineer or fireman.

Solving Many Problems.

Engine stop and speed limit devices are prominent at the exposition. J. K. Wright, New York, shows a model of the Wright automatic device. A more extensive exhibit is that of the Consolidated Engine Stop Co., New York, an actual size device being shown in operation. A remarkably rapid stopping of the machinery is possible in case of accident to either machinery or workmen. William Finn of New York, also shows a stopping device.

A device for protecting the blow-off pipes of steam boilers is exhibited by Edmund Mather, Harrisburg, Pa. This consists of a sleeve or covering of cast iron divided lengthwise and with ribs projecting inwardly so as to make an air space of half an inch between the pipe and the sleeve. A joiner guard for protecting the operator in the wood-working shop is shown by J. A. Davidson & Co., Eau Claire, Wis.

A large part of the exposition is devoted to devices for solving those safety problems on which the inventing public has been devoting its energies since the opening of the patent office. Safety awnings, trolley fenders, fire escapes, elevator safety locks, window guards, etc., are shown in profusion. Respirators, goggles and face masks for workers in dust are numerous. An interesting feature is the collection of first-aid outfits, among the exhibitors being the Red Cross Co., Boston, and Johnson & Johnson, New Brunswick, N. J.

At intervals during the exposition, lectures on industrial betterment and kindred topics are delivered by Director Tolman.

Judge Holland, in the district court of Philadelphia, Feb. 1, fined the Camden Iron Works Co., of Camden, N. J., $3,000 for accepting rebates on a shipment of iron pipe to Winnipeg, Manitoba. The pipe was shipped over the Philadelphia & Reading and the Baltimore & Ohio roads.

LACKAWANNA STEEL CO.

Year of Great Activity Reviewed by President Clarke.

E. A. S. Clarke, president of the Lackawanna Steel Co., has issued to the stockholders of that company a letter reviewing its operations during the year ending Dec. 31, 1906, together with a statement of income and earnings.

The report of President Clarke is as follows:

To the Stockholders of the Lackawanna Steel Co.:

I take pleasure in submitting to you a brief statement of the operations of your company during the year ending Dec. 31, 1906, together with a statement of income and earnings.

During the year your plant at Buffalo as originally planned has been completed, together with certain additions to open hearth steel making capacity found necessary to a proper working balance. The period of organization and training incident to all new works has prevented a full output and normal earnings; but, notwithstanding the fact that considerable construction work has been carried on during the year, most of the errors and weaknesses of plant and organization have been corrected, and it is only since October 1 last that it may fairly be said that your works have been in full operation.

Your company received during 1906 from mines, which it owns or in which it is interested, 1,893,662 gross tons of ore, and produced 927,176 gross tons of pig iron and spiegeleisen. It also produced 848,300 tons of Bessemer and 352,791 tons of open hearth ingots, a total of 1,201,091 tons of steel ingots.

Shipments of product were as follows, all in gross tons:

	Fourth quarter.	Year 1906.
Standard Rails	154,384	556,755
Light Rails	14,538	47,868
Angle Bars, fittings, etc.	11,081	43,639
Structural Shapes	41,164	121,407
Plates	21,556	95,244
Merchant Steel Products	16,108	52,401
Slabs, Billets & Blooms	6,122	17,078
Pig Iron and Miscellaneous.	1,525	34,655
Total	266,478	969,047

In anticipation of earlier operations, contracts for the sale of a considerable tonnage of steel were made during the period of low prices obtaining in 1904; owing to delay in completing your plant a substantial part of the above material has had to be shipped during the past year, which has prevented your realizing to a full extent the benefits of the active demand and favorable prices for steel prevailing during 1906. I am pleased to state, however, that there seems to be every indication of a continuance of prosperous times for the steel business during 1907.

Orders on our books at the close of 1906 amount to 707,494 tons, an increase of 55 per cent over the corresponding date in 1905.

The accompanying statement of earnings (which is subject to the annual audit now in progress) shows that during the last quarter of 1906 your property has been earning at the rate of 14.98 per cent per year on your stock. The year 1907 should show an increase over this.

There has been expended during the past two years in new construction and additions to property, chargeable to capital, $8,210,865.51, of which $2,754,487.99 was expended during 1906.

Your directors have, during the past year, authorized the construction of an additional blast furnace at Buffalo, of a daily capacity of 500 tons, and the building of the same has progressed so far that it is expected to have it in operation by March 1st next. Another similar furnace should be built during 1907 to give the best results for your property.

Your directors have also negotiated the purchase of the Ellsworth Coal Co., which owns some 15,000 acres of coking coal lands in Washington county, Pa., estimated to contain over 110,000,000 tons of coal, together with four working shafts, and a splendid equipment of machinery, miners' houses, etc., the property having a present annual capacity of upwards of 2,000,000 tons of coal a year. Through this purchase they feel that your company has been provided with an ample supply of coking and gas coal, which, by rendering it independent of the fluctuations of the coal and coke market, should considerably increase its earnings.

Although all the surplus of 1906 has been used for working capital or new construction, additions and improvements, your directors are satisfied that further new construction and additions are necessary and desirable for the proper development of your plants, as well as for reduction in operating costs, and that more ample working capital should be provided; and they are considering ways and means of providing proper funds for these purposes. Under these circumstances it has not been deemed wise to declare any dividend on your stock.

The complete balance sheet of the company's business, certified by the auditors, will be submitted to the stockholders at the annual meeting in March next.

By order of the board of directors.

E. A. S. CLARKE,
President.

Summary of Profit and Loss and Income Accounts for the Year, 1906.

GROSS SALES AND EARNINGS		$29,002,169 46
MANUFACTURING COST AND OPERATING EXPENSES		23,862,622 50
GROSS PROFIT		$5,139,546 96
Add: Income from Real Estate, Interest on Bills and Loans Receivable, and Investments in other Companies		870,110 20
GROSS INCOME		$6,009,657 16
Deduct: General Expense	$583,456 18	
Interest on Bonds of Subsidiary Companies and on Bills and Loans payable	231,842 89	
Rentals and Royalties	154,929 42	
Reserves for Depreciation and Extinguishment, Extraordinary Replacements, Contingencies, etc. (The last item is in addition to expenditures for ordinary Repairs and Maintenance, approximating $1,889,720.01).	430,463 82	
Interest on Bonds and Gold Notes of Lackawanna Steel Co.	1,250,000 00	
		2,650,692 31
SURPLUS NET INCOME		$3,358,964 85
Appropriated for Additions and Improvements to Property and Construction and for discharge of Capital Liability		515,506 76
BALANCE OF SURPLUS FOR THE YEAR 1906		$2,843,458 09

Comparative figures for the last quarter of 1906 are as follows:

Gross Sales and Earnings		$8,674,967 61
Manufacturing Cost and Operating Expenses		6,866,327 86
GROSS PROFIT		$1,808,639 75
Add: Income from Real Estate, Interest on Bills and Loans Receivable, and Investments in other Companies		289,988 40
GROSS INCOME		$2,098,628 15
Deduct: General Expense	$152,009 01	
Interest on Bonds of Subsidiary Companies and on Bills and Loans Payable	76,333 28	
Rentals and Royalties	40,495 26	
Reserves for Depreciation and Extinguishment, Extraordinary Replacements, Contingencies, etc. (The last item is an addition to expenditures for ordinary repairs and Maintenance, approximating $521,552.99).	206,441 46	
Interest on Bonds and Gold Notes of Lackawanna Steel Company	312,500 00	
		787,779 01
SURPLUS NET INCOME		$1,310,849 14
Appropriated for Additions and Improvements to Property, for Construction, and for Discharge of Capital Liability		175,110 02
BALANCE OF SURPLUS FOR FOURTH QUARTER		$1,135,739 12

THE MANUFACTURE OF CAST IRON CAR WHEELS.

A Review of the Development of the Circular Floor, Straight Line and Continuous Systems.—Introduction of Labor Saving Equipment.

PERATING methods, in no branch of the foundry industry, have reached a higher development than in the manufacture of cast iron car wheels; and so rapid has been the recent progress that, apart from a few novel systems — which have not been recognized by their general adoption — two have been evolved which are today considered standards. The circular floor, which still predominates, but which is hard pressed by the straight line system, Fig. 1, was used in the early days of car wheel manufacture when it was served by the irksome hand-power jib crane for aiding the molder in handling the heavy flasks and chills, the ladles, and for shaking out the wheels. This crane is now equipped with a pneumatic hoist, while the straight floors are commanded by electric trolleys and hoists, the latter either air or electrically driven. That the molder's daily output has been raised to twenty-five wheels, with the assistance of only one helper, shows to what extent production has been increased, and labor costs have otherwise been greatly curtailed by the systematic movement of the hot metal to the floors and the wheels to the annealing pits. Advocates of these two systems maintain that the interruption of operations, and delays occasioned by accidents to the ponderous machine parts, which are essential features of the several continuous processes in use, more than overcome their lessened cost of production; and it is also claimed that the use of the chills more than once a day results in an increase in the number of bad wheels, and considerable difficulty has also been experienced in tempering the sand for its repeated use.

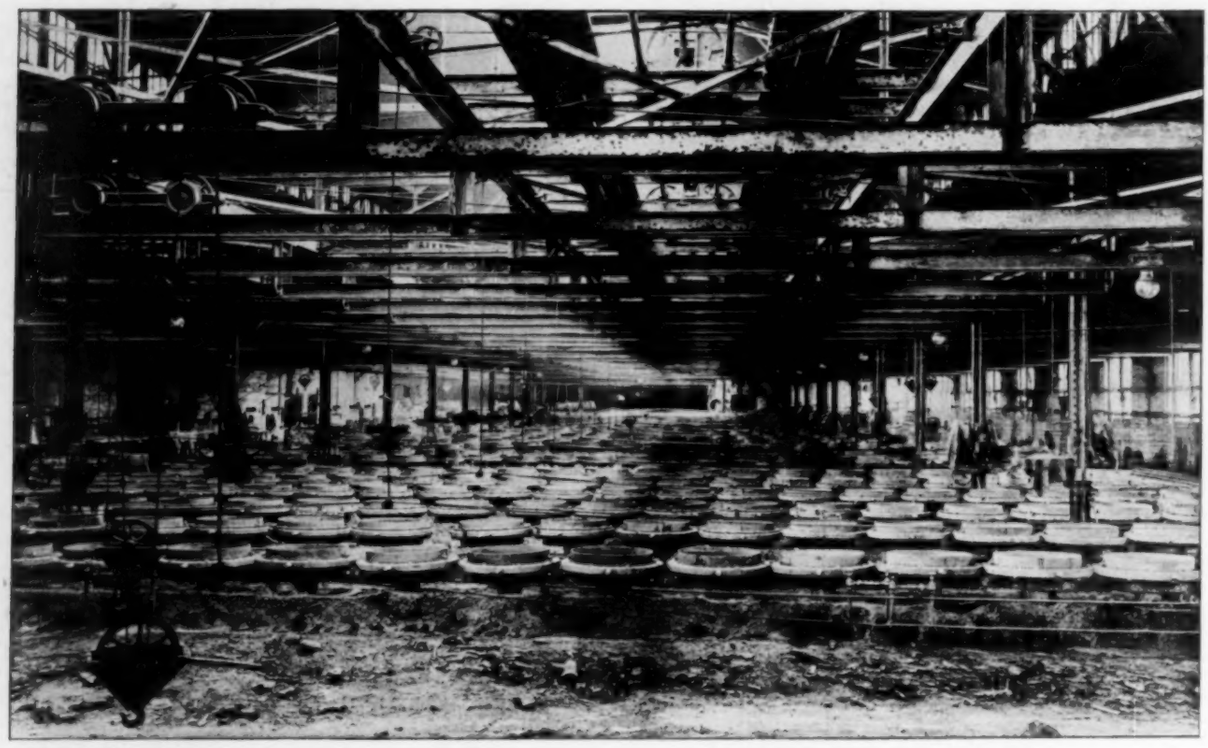


FIG. 1.—GENERAL VIEW, STRAIGHT LINE WHEEL FOUNDRY.

In this advancement the foundry engineer played no small part, as the design of the floors and use of labor-saving machinery to facilitate and increase production, reflect his skill. In only one plant has the molding machine been utilized with any degree of success, although manufacturers in this line have experimented for years to ultimately eliminate hand labor. With this method of making the molds practically fixed, for the immediate future at least, the burden of cost reduction necessarily devolved upon other departments.

Continuous Processes.

Wheels are made by a continuous process in the plant of the Central Car Wheel Co., McKees Rocks, Pa., the entire operation being divided into four parts, consisting of the making of the cope and drag, the pouring of the mold and the shaking out of the casting. The buggies carrying the flasks traverse a circular track, their movement being controlled by a rope haulage system. While a mold is being poured, the buggies are at rest, giving each man engaged on the successive steps an opportunity to proceed with his assigned part. This division of work to a large extent reduces the number of skilled men required, and greatly increases the daily output of each molder. Sand is delivered by a conveyor, and, after it is shaken out, is dropped through a grating in the floor into a pit where it is tempered and again supplied to the elevator for repeated use.

At the Terre Haute (Ind.) plant of

the American Car & Foundry Co., a continuous system has been evolved which combines the molding machine with other interesting features, as shown in the ground plan Fig. 2. The buggies which carry the flasks to and from the molding machines, operate on a rectangular narrow gage track system, the molds being made at one end of the foundry, and the wheels are shaken out and pitted at the other. The machines are of the squeezer type, and are operated by air, one being used for producing the cope and the other the drag. Each carries four duplicate patterns on a circular table which is given a quarter turn after the mold has been pressed. After the removal of the mold, the flask is placed over the pattern, another turn bringing it underneath the sand hopper. When the surplus sand has been removed by a sweep operating on a shaft attached to the hopper bottom, the flask is moved to a position above the pressure cylinder where the mold is made. The construction of the drag flask is unique, inasmuch as the ring and bottom plate customarily used are dispensed with entirely and make it possible to produce the mold by pressing the sand against the pattern. Efforts to make molds by pressing an adjustable pattern into the sand did not prove satisfactory, as the sand working into the pattern joints caused rapid wear. The drag part of the mold is made on the first machine and is placed on a buggy by means of a trolley, the pattern being lifted off by hand, in contrast with the lifting of the cope from the pattern. After the cores are set, it is carried by trolley to a buggy on the opposite track where the drag flask is already in place. This reduces the handling of the flask to the minimum as in the movement of the empty flask, the cope machine is reached first, and allows the chill to be lifted from the top.

When the wheel has been shaken out, the drag part is lifted off, and after the removal of the sand, is replaced on the buggy from which it has just been taken. After traversing the track in front of the wheel pits, it is transferred to the empty flask track, and is in a position to receive the cope as noted above. That the chills may have sufficient time to cool before they are used again, a storage track shown in the foreground of the plan view, is necessary. The sand, when shaken out, passes through a grating in a double deck hopper where it is tempered and carried to a reciprocating conveyor, after which it is screened cooled and delivered to the hoppers over each machine. In both systems the iron is melted continuously. Another process, which is now being tried, combines the circular track and a squeezer molding machine, but nothing definite is yet obtainable relative to the success of this venture.

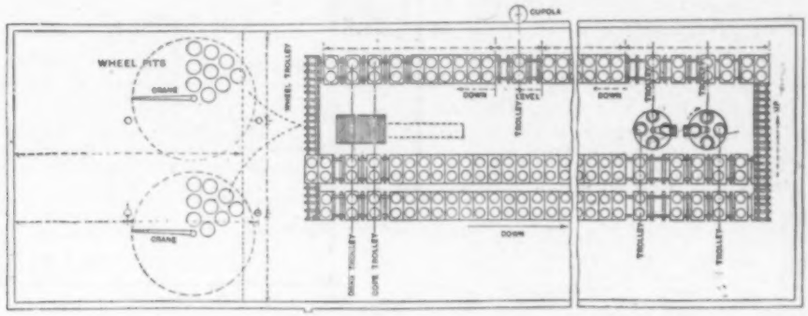


FIG. 2.—TERRE HAUTE PLANT OF THE AMERICAN CAR & FOUNDRY CO.

a forward movement of the buggy carries it under the trolley serving the cope machine, and after the cope has been set, the mold is clamped and is again moved forward to a point in front of the cupola where it is cast. After sufficient time has elapsed for cooling, the cope flask is lifted off, and, after the sand has been shaken out over a grating in the floor,

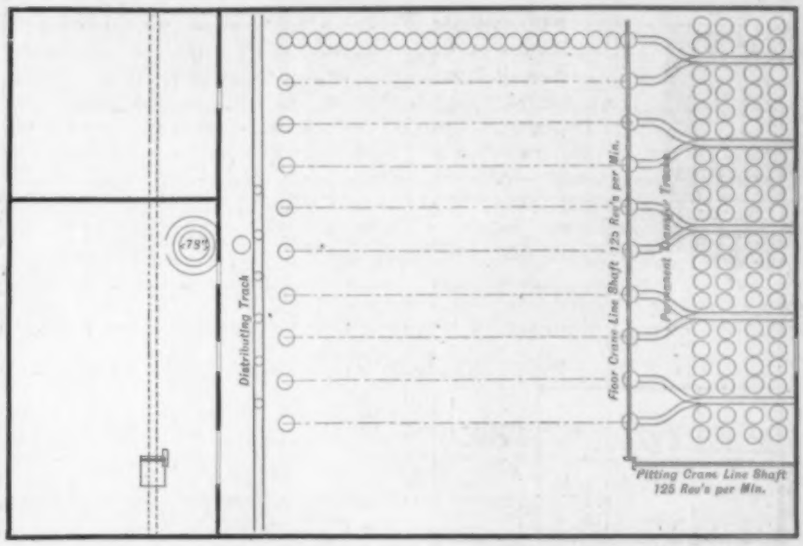


FIG. 3.—PLAN OF ONE OF THE FIRST STRAIGHT LINE FLOOR PLANTS.

Early Straight Floors.

The straight floor was first introduced within the last two decades, Fig. 3 showing one of the earlier arrangements, installed at Berwick, Pa. In this plan the cupola was placed in the center of one end of the foundry and the hot metal distributing track extended the width of the building instead of its length, the latter being in keeping with present day practice. There were, furthermore, only twenty-two wheels to the floor, as compared with twenty-five now generally made, and the distance from center to center of the floors was only nine feet, as against twelve in the more modern foundries. Floor cranes facilitated the handling of the metal and flasks, and the wheels were delivered to the pits on buggies, the track arrangement being somewhat unique. The 78-inch cupola does not compare favorably with the 102-inch monsters now being installed.

The eight-floor foundry, Fig. 4, built somewhat later, shows some progress and a slight improvement in the general arrangement. The cupola is at one side of the plant at about the center of the floors, and the hot metal distributing track parallels the length of the building. The floors, however, were only spaced a distance of nine feet, and the number of wheels required of each molder daily, was not increased. The location of

the annealing pits opposite the cupola was never repeated in subsequent plants. The length of the blast pipe, paralleling each side of the foundry. Although twenty-six wheels are laid out for each of the straight floors,

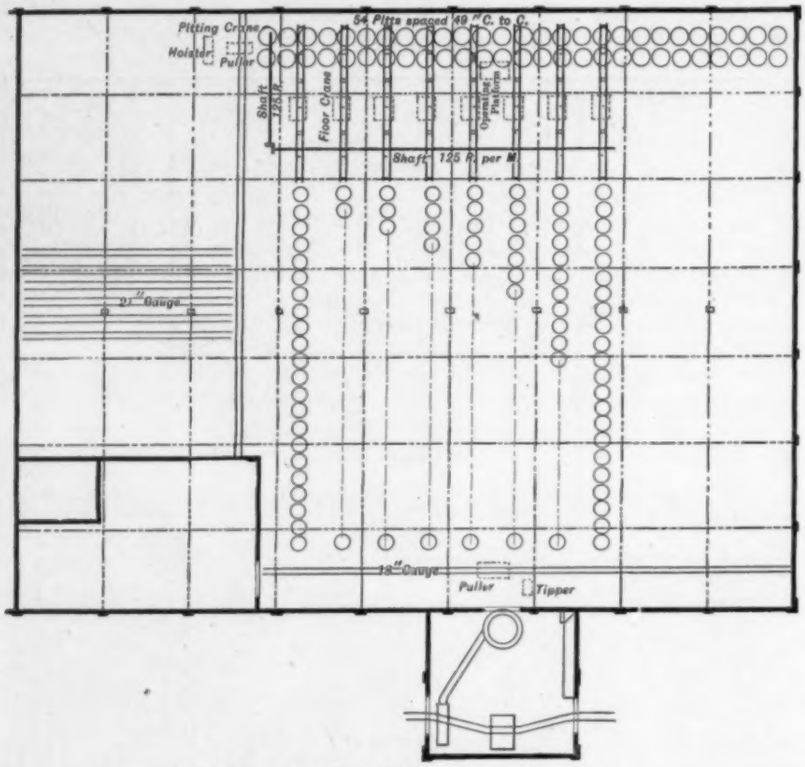


FIG. 4.—A LATER STRAIGHT LINE SYSTEM.

shown in the plan, has also been reduced to the minimum.

Comparison of Straight and Circular Floors.

Plans of a 325 wheel foundry, arranged for both straight and circular floors, are shown in Figs 5 and 6. That the straight floor system can be operated within a smaller area than that required for the jib crane method is indicated by a comparison of these two foundries. The molding department of the circular floor plant is given 36,960 square feet, while the straight line system requires only 21,580 square feet for a like capacity, and the foundries, including other departments, cover 44,000 square feet and 28,600 square feet respectively. The saving of cost in the erection of buildings, and smaller land area, were the factors which led to the adoption of the straight floor plan by the company to which these designs were submitted. Thirteen floors of twenty-five wheels each were provided in the circular arrangement, and the hot metal was to have been conveyed in ladles on trucks hauled by hand over floor plates, and the wheels were to have been delivered to the annealing pits on buggies operated on tracks only twenty-five will be made, and the hot metal will be distributed on a track paralleling the cupola side, while the wheels will be conveyed to the pits on buggies operating on a track extending the length of the building on the opposite side. Air will be furnished the two cupolas by blowers placed between them, and located on a mezzanine floor directly underneath the charging platform. Individual air hoists will serve each floor.

A Model Straight Floor Plant.

A plan view of the foundry of the Chicago, Milwaukee & St. Paul railroad shown in Fig. 7, represents the highest development of the straight floor method. Labor-saving machinery has been installed throughout, and the number of employes required for operating the circular floor plant, which was replaced, has been greatly reduced. The hot metal and wheel tracks parallel the length of the building on opposite sides, and the two cupolas, Fig. 8, are centrally located. The tilting of the reservoirs is electrically controlled, and provisions were made for their operation by hand in emergencies. The blower room, being located on a mezzanine floor below the cupolas, reduces the piping to the minimum, and gives the cupola operator direct control of the blast. The operation of the blowers is adjusted and maintained by regulators which control the speed of the motors. The charging floor is designed with a view to facilitating the rapid handling of a large amount of material. The charging cars are raised to the platform by two pneumatic elevators, and storage tracks, provided for each cupola, are connected by turn tables with the main tracks and the tracks leading to the cupolas.

The Altoona plant of the Pennsylvania Railroad company is the largest car wheel foundry in the country, having a producing capacity of 900 wheels daily, its molding department being divided into thirty-six floors. The six cupolas are distributed in pairs along one side of the building, and the two groups of annealing pits are located at either end to reduce the carrying distance of the hot wheels.

A rather unique circular floor foundry has just recently been completed by the

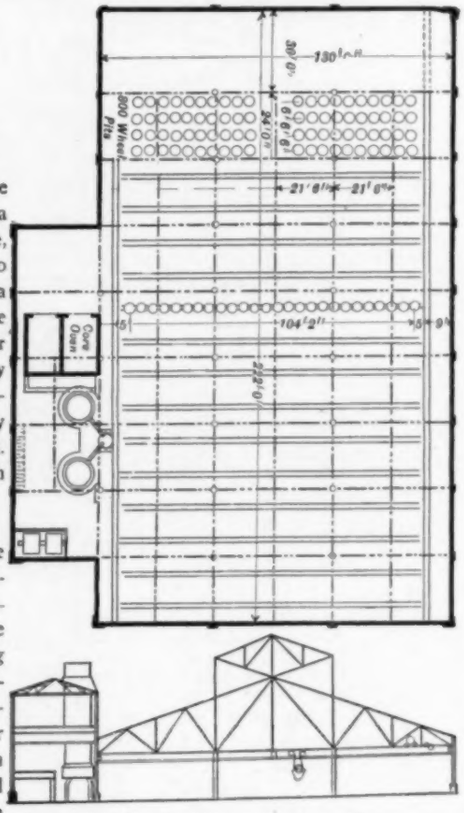


FIG. 5.—MODERN STRAIGHT LINE FOUNDRY.

Griffin Wheel company, at Pullman, Ill., which has its cupolas located at one end of the building, and the metal is distributed to the floors by means of overhead trolleys. The annealing pits are placed opposite the cupolas,

and the wheels are delivered to the pitting cranes on buggies operating on tracks between the floors.

Floor Hoists.

Operated by both air and electric power, floor hoists, of several different types, are in successful use. Not-

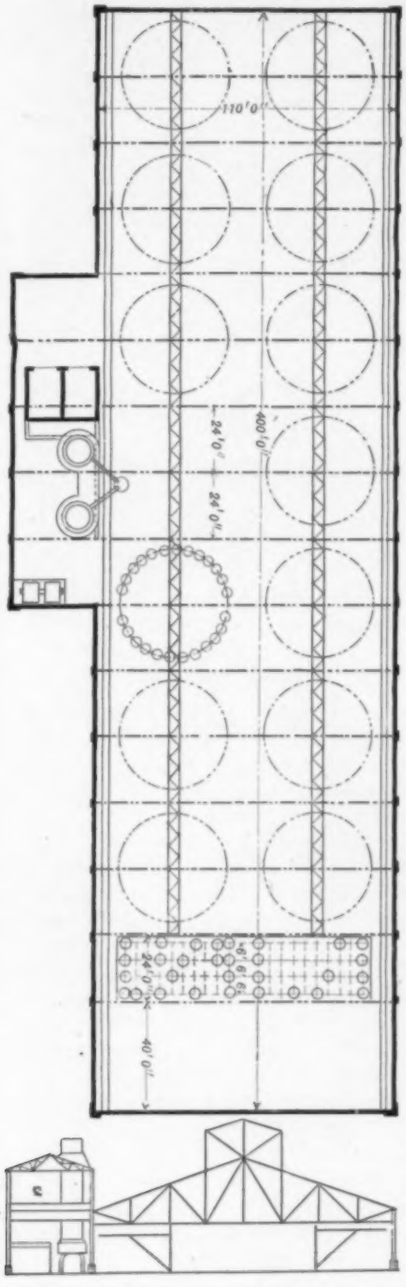


FIG. 6.—MODERN CIRCULAR FLOOR FOUNDRY.

withstanding the smoke and dust, enclosed motors have shown a long life and comparatively small expenditure for repairs. The electric hoists used in the South Altoona plant of the Pennsylvania Railroad company were built by Pawling & Harnischfeger, Milwaukee. They operate on the lower flanges of I-beams extending the length of the floors, having two of their four wheels geared for the trolley drives. The motors for both hoist and trolley, are attached to opposite sides of the frame and balance each other, and the hoist is so hung within the trolley frame that the load on the hook comes directly beneath the center of the wheel base. To the lower side of the hoist motor are attached two reversible controllers in the form of outriggers, which permit of the operation of the hoist without greatly interfering with the molder's work. One lever controls both the hoisting and lowering, as well as the trolley travel in either direction, inasmuch as a turn of the controlling bar in a horizontal plane affects the trolley travel, while a tilting of the ladle actuates the hoist motor. The controller connections are so arranged that the motion of the operator's hand is in the same direction as the desired movement of the machine.

The hoists installed in the Chicago, Milwaukee & St. Paul foundry by the Whiting Foundry Equipment Company, Harvey, Ill., shown in Fig. 9, are air driven, and the travelers are propelled

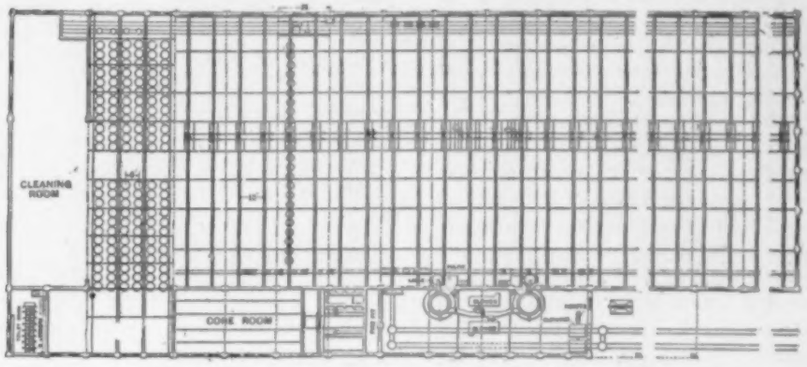


FIG. 7.—WHEEL FOUNDRY, CHICAGO, MILWAUKEE & ST. PAUL RAILROAD.

by a double friction motor drive. Separate hand ropes, suspended from the floors, control the forward and backward movement of the traveler, and the ropes actuating it, move in the same direction. The trolley drive is obtained from two overhead shafts, geared together and operating in opposite directions. On the shafts friction wheels are mounted, and the drum, carrying the traveler rope is mounted on a shaft with a friction pulley. This shaft is mounted in eccentric bushings and is shifted by a lever to engage with either friction

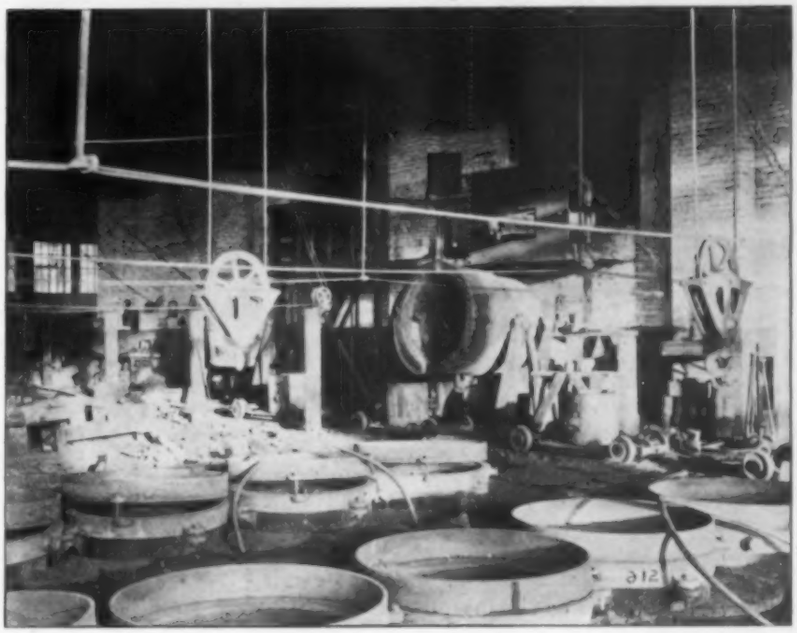


FIG. 8.—CUPOLA SIDE, MODERN CAR WHEEL PLANT, SHOWING HOT METAL CAR.

wheel. The hoisting movement is accomplished by means of an independent cylinder of the air-balanced type, Fig. 10, provided with a top head arranged for attaching it to the building

frame-work, and a bottom head provided with a stuffing box for the piston rod. The valve, which is independent of the cylinder, is attached to the building, and is provided with a controlling lever having a quadrant to which the controlling hand rope is attached, which extends the length of the floor and parallels the rope controlling the traveling movement.

Prior to the adoption of the friction motor drive, the power was transmitted from the driving shaft by four belts to each floor. It will be noted that the travelers in the Altoona shop are provided with independent motors, whereas the power, for the entire twenty-four floors at Milwaukee, is transmitted by two overhead shafts extending the length of the foundry, and operated by two motors.

Pitting Cranes.

Numerous types of pitting cranes are in use, and practically all are electrically operated. Those used by the Pennsylvania Railroad company at Altoona are equipped with four hoists, and are equipped with two 1,000-pound hoists having center bore tongs which lift the wheels from the buggies and deposit them in the pits.

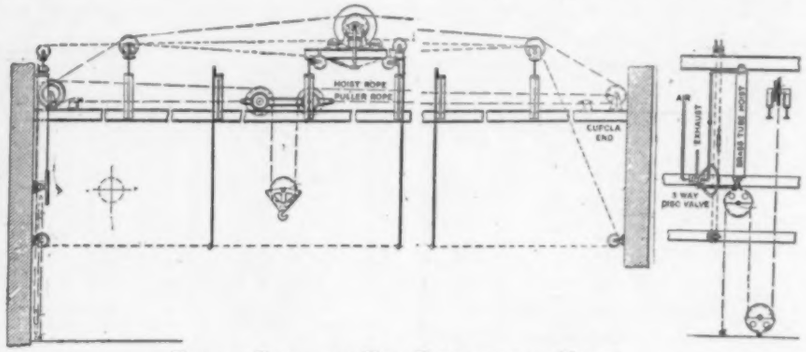


FIG. 9.—PLAN AND END ELEVATION OF HOIST.

Suspended from, and underneath the crane bridges, are the operator's cages which clear the tops of the pits by about one foot, permitting the operator to travel with the work. A switchboard for the motors is fastened to the cage, and the two hoists, attached to the under side of each

FIG. 10.—HOT WHEEL TRACKS, STRAIGHT LINE SYSTEM.

a fifth being provided for emergencies. The three cranes, Fig. 11, installed by Pawling & Harnischfeger, Milwaukee, in the foundry of the Chicago, Milwaukee & St. Paul Railroad company, serve two rows of pits each, bridge, are so located that the hoisting ropes and bottom blocks hang directly over the center line of the pits.

Charging Machine.

The cupola charging machine, shown in Fig. 12, is built by the Whiting Foundry Equipment Co., Harvey, Ill., and has been installed in a number of plants recently erected. By its use the charges on the cars are dumped into the cupola by means of an air hoist, which raises one side of the car to an angle of 40 degrees, the other side remaining almost stationary. When in position in front of the charging door, the hoist raises the floor plate on which the car rests, and to prevent it from sliding off the track, the car is held in place by means of a hook which engages an eye fastened to the side sills. A steel plate lip, extending from the charging door, prevents the dropping of any of the material outside of the cupola.

Bottom Door Hoist.

To facilitate the closing of the cupola bottom doors, the device shown in Figs. 13 and 14 has been widely adopted. It consists of an air hoist with a chain attached to its lower end which engages an eye in the center of the door, passes over a wheel secured to the cupola support, and the upward movement of the hoist hook raises the door in place. When in position, each door is held by a screw prop bearing on a cast iron base underneath the cupola. A steel prop is wedged between the screw supporters to hold the doors in place after the removal of the screw props just before the bottom is to be dropped. Then by means of a long bar with a hook-end this prop is upset, and the bottom is dropped without endangering the employes engaged in this work.

Wheel Breaker.

The old style "plum bob" wheel breaker is also being rapidly replaced by a wheel breaking machine, equipped with a 2,000-pound cast iron drop, which falls from a height of 12 to 16 feet and is lifted by an air hoist, attached to the side of the frame work, which is of heavy steel construction. The machine is patterned after a pile driver in general design, the drop moving in guides and

is automatically released.

For the wheels now generally used only center and pan cores are required, although core gates are used to some extent instead of the ordinary sand gates. Nor is the contracting chill used as extensively as heretofore, as it has been largely replaced by one of the ordinary type which gives the required chill depth. Annealing pits vary in height from 10 to 16 feet, this being largely governed by local conditions, and the cooling of the wheels requires from five to six days.

FIG. 11.—ANNEALING PITS SERVED BY THREE DOUBLE HOIST ELECTRIC TRAVELING CRANES.

Physical Tests.

The specifications, to which the wheels must conform, and the tests, to which they are subjected, prescribed by the Master Car Builders' Association, are most severe, and in this connection may be briefly referred to. Wheels weighing 600, 650 and 700 pounds are for cars 60,000, 80,000 and 100,000 pounds capacity, respectively. Wheels of the same normal diameter must not vary more than ¼ of an inch above or below the mean size measured on the circumference, and on the same wheel must not vary more than 1-16 of an inch in diameter. The depth of white iron must not vary more than 1-4 of an inch around the tread on the rail line in the same wheel, and must not exceed one inch, nor be less than 1-2 inch, in the middle of the tread for wheels weighing 600 pounds; and shall not exceed one inch in the tread nor 1-2 inch in the throat for wheels weighing 700 pounds. Any individual wheel not conforming to the standard design and measurements, under weight, or having any of the physical defects noted, will not be accepted. For each of the 100 wheels which pass this inspection, two are selected at random, one of which is subjected to the drop test. The wheel is placed flange downward on an anvil block weighing not less than 1,700 pounds, and is struck centrally on the hub by a weight of 200 pounds, which delivers ten blows falling from a height of nine feet for a 600-pound wheel, and twelve blows from a height of 10 feet for a 700-pound wheel. If the wheel withstands this test without breaking, it is subjected to the thermal test. The wheel is laid flange down in the sand and a channel way 1 1-2 inches wide and four inches deep is molded around it with green sand. The tread forms one side of the channel way, and the flange as much of the bottom as its width will cover. The channel way is then filled to the top with molten cast iron which must be hot enough when poured, so that the ring which is formed, when the metal is cold, shall be solid and free from wrinkles. Two minutes after pouring an examination of the wheel is made, and if found broken, or if any cracks in the plate extend through or into the tread, the 100 wheels represented by the test are rejected. In the case of the drop test, if the wheel breaks with less than the required number of blows, then a second is taken from the same lot and tested, and if unbroken, it is optional with the inspector whether he shall test the third wheel or not. If he should do so, and the latter withstands the test, the 100 wheels are accepted as filling the requirements of the drop test. It is further specified that the wheels must not vary more than two per cent from the required weight.

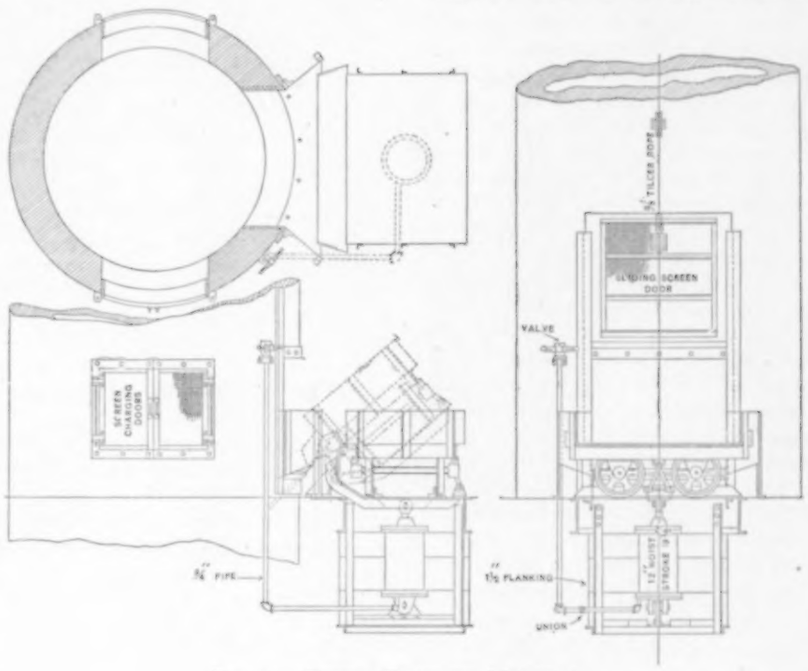


FIG. 12.—CUPOLA CHARGING MACHINE

Notwithstanding these requirements the foundry losses in the most modern plants average less than one per cent, although two per cent is considered

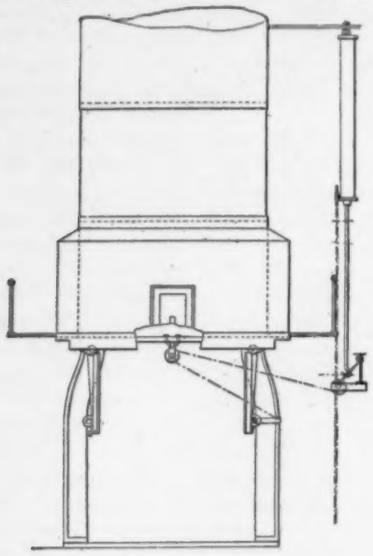


FIG. 13.—BOTTOM DOOR HOIST.

normal, and losses ranging from three to five per cent are not considered in keeping with the best practice.

REFLECTS PROSPERITY.

A remarkable story of the advance in the industries of Pennsylvania in the past 20 years is reflected by the enlarged volume of business done by the railroads operating in 1906 as compared with the hauling of lines in 1887. The tonnage carried in 1906, according to the record compiled by the state bureau of railroads, was 710,829,765 tons, as compared with 216,979,820 tons in 1887. The total earnings of the roads were $790,984,377 in 1906, and $199,192,666 in 1887. The freight earnings were $527,715,751 in 1906, and $146,154,537 in 1887, and the passenger earnings were $172,080,775, as against $39,819,423. The total operating expenses increased from $124,336,503 to $472,058,200; the mileage from 9,000 to 11,000; the locomotive equipment from 5,737 to 15,572; the total number of cars, passenger and freight, from 241,286 to 675,726, and the total cost of the roads from $894,834,301 to $2,450,910,596.

New Company's Officers.—The Seneca Iron & Steel Co., of Buffalo, which lately began the construction of a sheet steel rolling mill at Buffalo, has organized by electing the following officers: President, James Patterson; vice president, Hugh Kennedy; treasurer, Alexander Patterson; secretary, H. M. Van Horn; directors, James Patterson, Alexander Patterson, S. B. E. McVay, Clifford Hubbell and Hugh Kennedy.

SCRAMBLE FOR SCRAP

Is a Feature of English Markets.—Blast Furnace in a University.

Office of THE IRON TRADE REVIEW.
Prince's Chambers, Corporation St., Birmingham, England. Jan. 19, 1907.

One of the results of the scarcity of iron is the general scramble for scrap. On Jan. 1, the whole of the Birmingham steam tram engines were transferred from the lines to the scrap yard, being replaced by electric cars. The purchasers were Messrs. J. Ward & Co., machinery brokers, of Sheffield. Of course, the engines are entirely obsolete and will be broken up for scrap. This will find a ready sale at profitable prices. The firm recently purchased an old battleship from the admiralty for £18,000, a very good bargain. At the present time, the various scrap and brokers' yards of Birmingham, are being scoured and scraped for old metal which fetches an excellent price.

One of the most interesting events likely to take place in Birmingham during the present year will be the formal opening of the new university at Bournbrook, the building of which was due to the initiative of Mr. Joseph Chamberlain. This is a matter of some moment to the iron trade, because a very large part of the new institution is devoted to metallurgy, and the metallurgical department generally cannot be rivaled, or even approached in this country. There is a very well equipped steel smelting laboratory, equipped with a Siemens regenerative furnace, with casting pit and lift complete, and there is a blast furnace and a foundry for experimental steel and brass work. Practically the whole equipment is entirely up-to-date, and Prof. Turner, under whose supervision the scheme has been developed, has succeeded in incorporating the very latest ideas. The department will attract students from all parts of the kingdom, and is likely to have, when in full operation, a world-wide fame.

Alderman Richard Williams, of Wednesbury, formerly manager of the Patent Shaft & Axletree Co., has lately been the recipient of numerous congratulations on the attainment of his 91st birthday.

The Birmingham fire of Messrs. Alfred Dickinson & Co. has succeeded in initiating a huge scheme for utilizing the great rainy district of the Western Ghauts for the production of electrical energy for India. It is proposed to use this energy for the driving of the cotton mills of Bombay. The scheme will be a gigantic one, involving the conveyance of energy for 43 miles, but there is no doubt in the minds of the promoters that it will be mechanically and commercially successful. Dr. John Mannheim, representing the firm, is at present in Bombay promoting the general arrangements. The scheme is estimated to be the largest in the world for the utilization of stored water, and second only to Niagara in the use of water power. The success of the Birmingham firm is a windfall to this country, as it is expected that the whole of the machinery and plant, running to the value of three-quarters of a million, will be furnished by British firms.

A useful hint as to pig iron prices is furnished by the accountants' ascertainment just published of the average net selling price of No. 3 Cleveland pig iron for the three months ended Dec. 31. The price was £2 13-4d.46 against £2 10-7d.42 for the previous three months. Under the sliding scale, this concedes

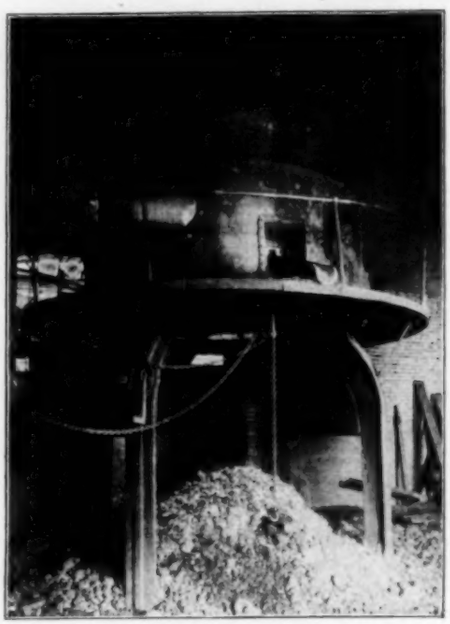


FIG. 14.—BOTTOM DROPPED.

an advance in the wages of furnacemen amounting to three and a quarter per cent, raising the wages of Cleveland, Durham and Tyneside men from 23¼ to 26½ per cent above the standard.

Ship builders are not particularly elated at present over the state of trade. At the end of the year there were 461 vessels of 1,166,939 tons gross under construction in the United Kingdom, as compared with 1,356,756 in December of the previous year. For the six months there was a diminution of 242,000 tons. Undue importance may, of course be attached to these figures for the reason that the work in hand a year ago was altogether abnormal. Ship builders have every reason to be proud of 1906 as a year of big things. The launching of the two big Cunarders would suffice to have made any year notable. Messrs.

THE ART OF CUTTING METALS[1]

(Continued from last week.)

By Fred W. Taylor.

FORGING AND GRINDING TOOLS.

The Shape of Tools as Affected by Grinding and Forging.

The following are the important conclusions arrived at upon this subject:

(A) The shapes into which tools are dressed and the ordinary methods of dressing them are highly uneconomical, mainly because they can be ground only a few times before requiring redressing.

(B) The tool steel from which the tool is to be forged should be one and one-half times as deep as it is wide. The standard length for tools will be found in the following table:

Rule for Length of Roughing Tools.

Width of shank of tool =A; length of tool = L; then L = 14A + 4 inches.

Size of shank of	Length of tool
½ x ¾	11
⅝ x 1	12¾
¾ x 1¼	14½
⅞ x 1⅜	16¼
1 x 1½	18
1¼ x 1⅞	21½
1½ x 2¼	25
1¾ x 2⅝	28½
2 x 3	32

(C) To avoid the tendency of the tool to upset in the tool post under pressure of the cut, the cutting edge and the nose of the tool should be set well over to one side of the tool.

(D) Tool builders should design lathes, boring mills, etc., with their tool posts set down lower than is customary below the center of the work.

(E) In choosing the shape for dressing a tool, that shape should be given the preference in which the largest amount of work can be done for the smallest combined cost of forging and grinding.

(F) Forging is much more expensive than grinding, therefore the tool should be designed so that it can be ground the greatest number of times with a single dressing; and with the smallest cost each time it is ground.

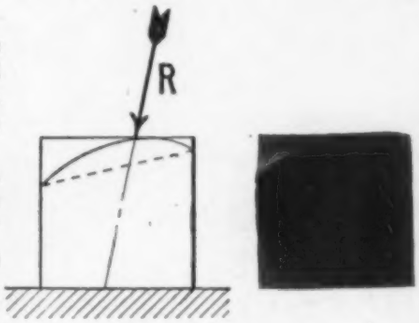


Fig. 42.—English and Old American Square Body Tool.

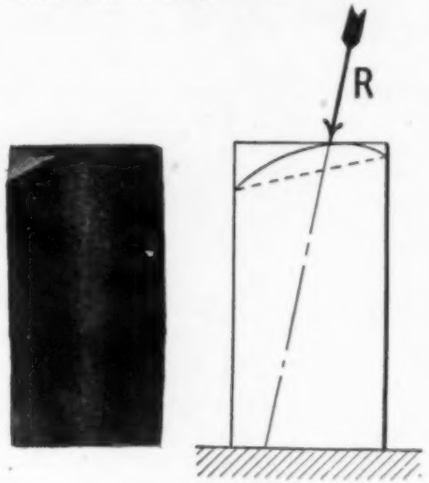


Fig. 43.—Recent American Standard Body for Tool, 1 Inch Wide by 2 Inches High.

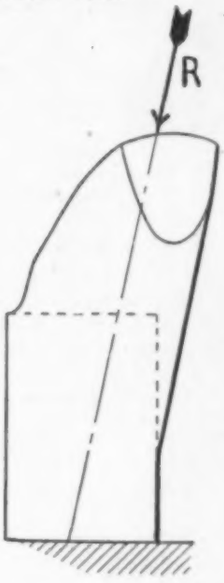


Fig. 44.—Taylor Standard Body for Tool, 1 Inch Wide by 2 Inches High.

Figs. 42, 43, 44.—Position of Resultant Line of Pressure on Tools with Bodies of Different Shapes.

(G) Best method of dressing a tool is to turn its end up high above the body of the tool. Tools can be entirely dressed by this means in two heats. Detailed steps in forging a tool by this method will be shown later.

(H) Importance of carefully heating the tool for dressing:

(J) Fire or heat cracks in tools are due to the following causes:

a Seams or internal cracks in bar of tool steel.

b Nicking and breaking the bar of tool steel while it is cold.

c Failing to turn the tool over and over while heating it for forging.

d Too rapid heating, particularly at the start, in a hot fire.

(K) It is of great importance to properly adjust the relative amount of work to be done in the smith shop and on the grinding machine in making the tool. Too much work is generally done in dressing tools to exact shape in the smith shop, particularly when automatic grinding machines are used. A limit gage should be used by the smith to properly regulate the proportion of smith work and grinding work in making the tool.

Grinding Tools.

The following are the important conclusions arrived at with reference to grinding tools:

(A) More tools are ruined in every machine shop through over heating in grinding than from any other cause.

(B) The most important consideration is how to grind tools rapidly without overheating them.

(C) To avoid overheating, a stream

[1]Presidential Address, A. S. M. E., 1907.

of water amounting to five gallons per minute should be thrown, preferably at a slow velocity, directly on the nose of the tool where it is in contact with the emery wheel.

(D) To avoid overheating where tools are ground by hand or with an automatic tool grinder, the surface of the tool should never be allowed to fit closely against the surface of the grindstone. To prevent this, tools should be constantly moved or wobbled about during the operation of grinding.

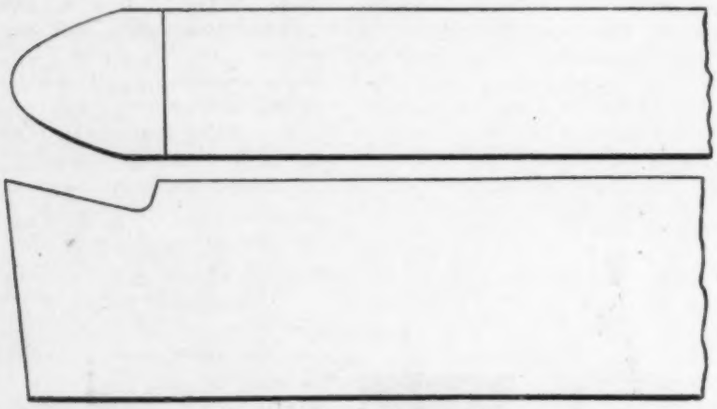


FIG. 45.—BADLY SHAPED TOOL.

(E) To lessen the danger of overheating on the emery wheel and to promote rapid grinding, tools should be dressed so as to leave the smith shop with a clearance angle of about 20 degrees, while 6 degrees only is needed for cutting.

(F) Flat surfaces upon tools tend far more than curved surfaces to heat tools in grinding.

(G) Tools with keen lip angles (i. e., steep side slopes) are much more expensive to grind than blunt lip angles.

H) It is economical to use an automatic tool grinding machine even in a small shop.

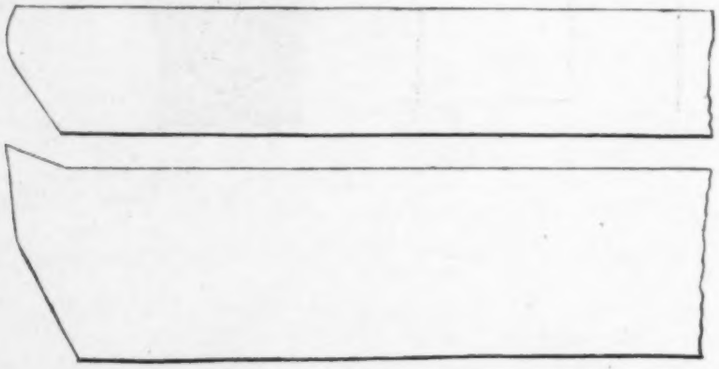


FIG. 46.—BADLY SHAPED TOOL.

(J) There is little economy in an automatic grinder for any shop unless standard shapes have been adopted for tools, and a large supply of tools is kept always on hand in a first-class tool room, so that tools of exactly the same shape can be ground in quite large batches or lots.

(K) Corundum wheels made of a mixture of grit size No. 24 and size No. 30 are the most satisfactory for grinding ordinary shop tools.

(L) In grinding flat surfaces skillful hand grinders invariably keep the tool wobbling about on the face of the grindstone in order to avoid heating.

Size and Proportion of the Body of the Tool.

Twenty-five years ago, it was perhaps the more general practice in this country to make the cross-section of the body of lathe and planer tools square and this practice still generally prevails in England and upon the continent. In fact, in the report of the Manchester experiments, referred to in this paper, in which the tools of eight of the leading engineering establishments were placed in competition, all of the tools illustrated have square shanks. James M. Gledhill also, in his admirable paper, on "The Development and Use of High Speed Tool Steel," read before the Iron and Steel Institute in 1904, refers to tools with

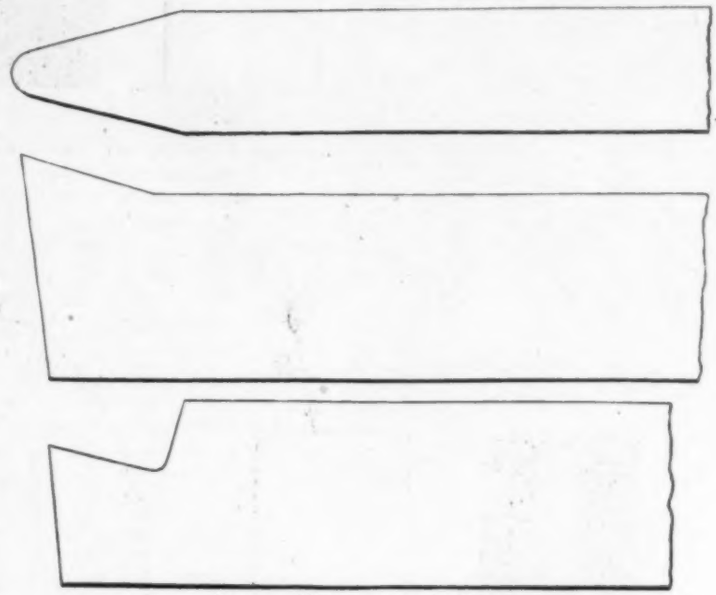


FIG. 47.—BADLY SHAPED TOOL.

square shanks as being the standard in use in the works of Armstrong, Whitworth & Co. It may be said, however, that the more general practice in this country at the present time is to make the depth of the body of the tool considerably greater than its width.

In choosing the proportion of the height of the shank to its depth, the effect of two forces must be considered—the downward pressure upon the nose of the tool, due to cutting the chip; and the side pressure at right angles to the tool due partly to the feeding resistance, and partly to the direction in which the chip moves across the lip surface.

Dr. Nicolson, in his experiment, has shown that in the great majority of

cases the side pressure upon the tool does not exceed 20 per cent of the downward pressure; and that more frequently the side pressure is even a smaller percentage of the vertical pressure. On the other hand, tools when properly designed and properly placed in the tool post are supported in the majority of cases almost directly beneath the cutting edge, thus directly resisting the downward pressure upon the tools, and placing it mainly under compression, and so greatly diminishing the heavy downward transverse bending and breaking strains. If, then, tools were always set in their most advantageous position in the tool post, the practice of using steel of square cross-section might not be far wrong. However, in both lathe and planer work it is often necessary to set the tool with considerable overhang beyond the tool support, and in these instances it is evident that the depth of the tool should be considerably in excess of the width; because it must be borne in mind that the transverse strength of a rectangular bar under vertical pressure increases with the square of its depth, while it increases only in direct proportion to the width.

It is manifestly of great importance to have the tools as light as possible consistent with their strength both for ease of handling, in setting the tool in and removing it from its tool post, in grinding and in dressing; and a much lighter tool of equal strength and stiffness can be used when the height exceeds the width than when the cross-section is square.

For the above reasons some of the large machine shops in this country have adopted a proportion of two in height to one in width for the cross-section of their standard tools.

However, owing to the desirability of turning the noses of tools high above the top surface of the body of the tool for economy in grinding and dressing, and also owing to the design of the tool posts of the greater part of the machines in this country (referred to later), it is, in the judgment of the writer, unwise to adopt a height as great as two to one for the body of the tool. After practical trial on a large scale and close observation of several different proportions, we have adopted as standard the section of 1½ in height to one in width for the body of the tool.

There is one other element, however, which requires consideration, namely, the tendency to upset the tool or turn it over on to its side. It is clear that the higher the nose of the tool is raised above the point of support and the narrower the width of the tool, the greater becomes the tendency to upset the tool sideways; and that in many respects what may be called the English, Continental and old American standards of square section tools with cutting edges close to the level of the top of the tool, appear to offer far greater stability than our standard.

Importance of Bending the Nose of Tools Over to One Side to Avoid Danger of Upsetting.

The tendency to upset may be mathematically defined as having the resultant line or direction of the combined vertical cutting forces and lateral feeding forces fall outside of the supporting base of the tool. Figs. 42, 43 and 44 show three views of tools. Fig. 42 represents the English type of tool, Fig. 43, the American type, as perhaps in more common use, and Fig. 44 our standard tool. In each case the heavy line drawn from the cutting edge of the tool downward and to the left indicates the resultant line of pressure upon the nose of the tool. It will be observed that in the case of the English type of square sectioned body the resultant line of pressure falls well within the base of the tool, while in the average American type the resultant line comes close to the outer edge of the base of the tool. With our standard tool, the resultant line of presure again falls close to the center of the base of the tool. This has been our principal reason for bending or setting the nose or cutting edge of all of our tools far over to one side of the center line of the shank, explained later, and as seen in all of the views of our standard tools. Thus it will be noted that our standard tool has all of the advantages of the American type, together with the additional stability of the English type. This plan of setting the tool over to one side has also great advantages in cheapening the grinding and in diminishing the danger of overheating the cutting edge in grinding.

The serious mistake, then, in the design of the average American type of body has been that of following the English and Continental practice in

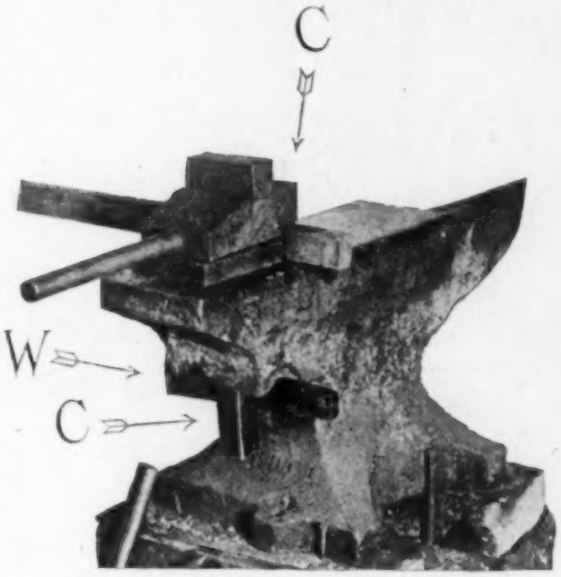


FIG. 48.—TOOL CUT OFF FROM BAR AND CLAMPED ON SMITH'S ANVIL READY TO BEND DOWN, ("TURN UP.")

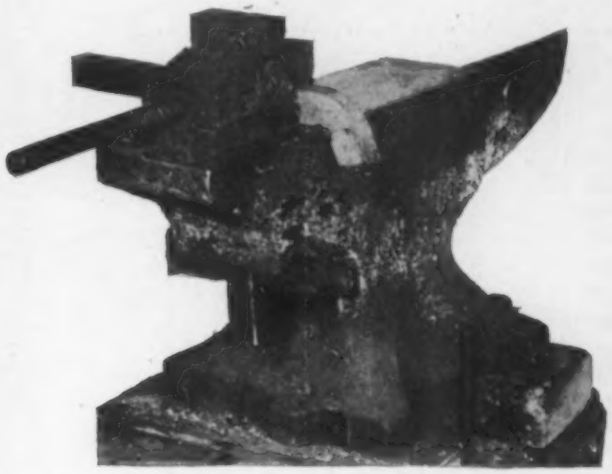


FIG. 49.—TOOL BENT DOWN ACROSS EDGE OF THE ANVIL, ("TURNED UP.")

keeping the curve of the cutting edge symmetrical or central with the body of the tool, instead of moving it over so as to be well outside of the base of the tool.

Importance of Lowering Tool Supports in Designing Machine Tools.

We attach so much importance to raising the nose of the tool above its top surface and at the same time having the section of the body of the tool deeper than its width, that we would especially call the attention of machine tool builders to the desirability of designing their tool supports in lathes, boring mills, etc., further below the centers than is customary. When preparing for the best shop standards in reorganizing the management of machine shops, it has become our custom to systematically go over all of the machine tools and lower the tool rests to as great an extent as is practicable. Fortunately this in many cases entails but a small expense. However, in other cases it has been found desirable and economical to redesign the cross slides of many lathes so as to accomplish this object.

The Length of the Shanks of Cutting Tools.

In choosing the proper lengths for cutting tools, we again find two conflicting considerations.

(A) It requires a certain very considerable length for the shank of each sized tool in order to fasten or clamp it in its tool post. When the tool becomes shorter than this minimum, it must be thrown away, thus wasting costly metal, particularly in the case of the modern high speed tools.

(B) On the other hand, the longer the body of the tool, the more awkward and the slower become all of the operations in handling the tool, beginning with the dressing and followed by the grinding, storing, handling in the tool room, and setting and adjusting in the machine.

We know of no definite, clear cut method of comparing the relative loss in handling long and heavy tools with that of the waste of the tool steel, so that the adoption of a standard length for dressing tools of various sizes has been largely a matter of "rule of thumb" judgment on our part. We give, however, in the table above the length of tools, which we have adopted corresponding to different sized bodies.

Tools Should be Designed so That Largest Amount of Work Can be Done for Smallest Combined Cost of Forging and Grinding.

In adopting the general shape or conformation of a tool (we do not here refer to the curve of the cutting edge), the most important consideration is that of selecting a shape with which the largest amount of work can be done for the smallest combined cost of forging or pressing and grinding, and the dressing is much the more expensive of these two operations. It is, therefore, of paramount importance to so design the tool that it can be ground the greatest number of times with a single dressing and with the smallest cost each time it is ground.

Modern high speed tools when run at economical speeds are injured much more upon the lip surface than upon the clearance flank. Therefore, at each grinding a larger amount of metal must be ground away from the lip surface than from the clearance flank; and yet in many cases the clearance flank will be more or less injured (rubbed or scraped away) below the cutting edge, and it therefore becomes necessary, for maximum economy, in practical use, to grind roughing tools both upon their lip and their clearance surfaces.[1]

In Fig. 1e is shown the typical wear on a tool which has been run at an economical speed. This tool has been guttered out on the lip surface and also slightly rubbed away on its clearance flank. It is evident that if it were ground on the lip surface alone a considerable amount of the metal would be wasted before the cutting edge of the tool could be completely resharpened.

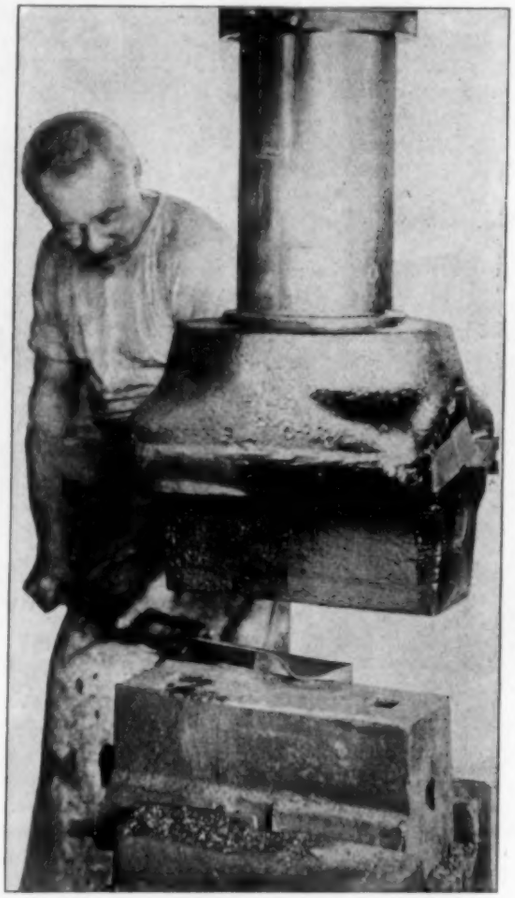


FIG. 50.—HEEL OF TOOL BEING DRAWN DOWN UNDER STEAM HAMMER, TO GIVE SUPPORT TO NOSE ALMOST DIRECTLY BENEATH CUTTING EDGE.

On the other hand, it is clear that if the tool were to be ground on its clearance flank alone, a much larger amount of metal must be ground off before entirely restoring the line of the cutting edge. This shows that for economy tools must be ground both upon their lip and clearance surfaces.

In many shops the practice still prevails of merely cutting a piece of the proper length from a bar of steel and grinding the curve or outline of the cutting edge at the same level as the top of the tool, as shown in Figs. 45 and 46. This entails the minimum cost for dressing, but makes the grind-

[1] IRON TRADE REVIEW, Jan. 10, 1907.

ing very expensive, since the lip surface must be ground down into the solid bar of steel, thus bringing the corner of the grindstone or emery wheel at once into action and keeping it continually at work. This quickly rounds over the corner of the stone, and necessitates its frequent truing up, thus increasing the cost of grinding both owing to the waste of the stone and the time required to keep it in order; and it also leaves the face of the grindstone high in the center most of the time, and unfit for accurate work.

As far as possible, then the shape of standard cutting tools should be such as to call for little or no grinding in which the corner of the emery wheel does much work. With the type of tool illustrated in Fig. 45 also, comparatively few grindings will make a deep depression in the body of the tool, as shown in Fig. 47, and this depression will of course be greater the steeper the back slope of the lip surface of the tool.

To avoid these difficulties, perhaps the larger number of well managed machine shops in this country have adopted a type for dressing their tools in which the front of the tool is forged slightly above the level of the tool, as shown in Figs. 46 and 47. This type of tool dressing is done in each of the following ways:

(A) By laying the tool on its side and slightly flattening its nose by striking it with a sledge, thus narrowing the nose of the tool, and at the same time raising it slightly above the level of the top of the tool, as shown in Fig. 47.

(B) By cutting off the clearance flank of the tool at a larger angle than is demanded for clearance and then slightly turning up the cutting edge of the tool through sledging upon the clearance flank while the tool is held upon the edge of the anvil with its shank below the level of the anvil. This type of dressing is shown in Fig. 46.

The objection to both of these types is that the tools require redressing after being ground a comparatively small number of times, and that when redressed in many cases the whole nose of the tool is cut off and thrown away. This waste of metal, however, is of much less consequence than the frequency of dressing.

It will also be observed that with the first of these types of tool dressing the tendency is to make the nose of the tool too thin, that is, having too small a radius of curvature, and thus to furnish a tool which must be run at too slow cutting speeds. It will be noted that both of these types of tool dressing call for at least one heating of the tool and that in most cases the tool is actually heated twice.

Best Method of Forging a Tool is to Bend or Turn Up Its End.

Undoubtedly one of the most economical shapes for tools, when both dressing and grinding costs are considered, is that shown in our standard tools, Figs. 22 to 26.[2]

In examining these tools it will be noted that in the 1½-inch tool, for instance, the cutting edge is 1 3-16 inches above the top of the body, and if we assume that 1-32 of an inch of metal ground off from the height of the tool will be sufficient to sharpen the cutting edge on an average, it is evident that a tool of this shape can be ground 24 times before the corner of the emery wheel begins to cut into the body of the tool. If after this we continue to grind the tool, there will still remain as many grindings on this tool as upon the tool, Figs. 47 or 41,[3] before the wheel shall have ground down into the body of the tool for a sufficient depth to weaken it. Thus it is clear that our standard tool has a shape which permits it to be reground from three to five times as many times as the ordinary shape shown in Fig. 47.

In dressing these tools the end of the piece of steel to be made into the tool is bent or turned up by sledging it down across the corner of the anvil. Figs. 48 to 60 illustrate one method of doing this work. It is of interest to note that after the steel from which the tool is made has been cut to the required length and properly marked for identification, these tools up to and including tool steel of one inch by 1½ inch can be completely dressed by a good smith and his helper ready for grinding in two heats, providing a small steam hammer with plain flat dies is available for striking the tool a few blows at the proper time; also that without a steam hammer, each tool can be readily dressed with three heats by a smith

FIG. 51.—CUTTING ROUGHLY TO PROPER LIP ANGLE.

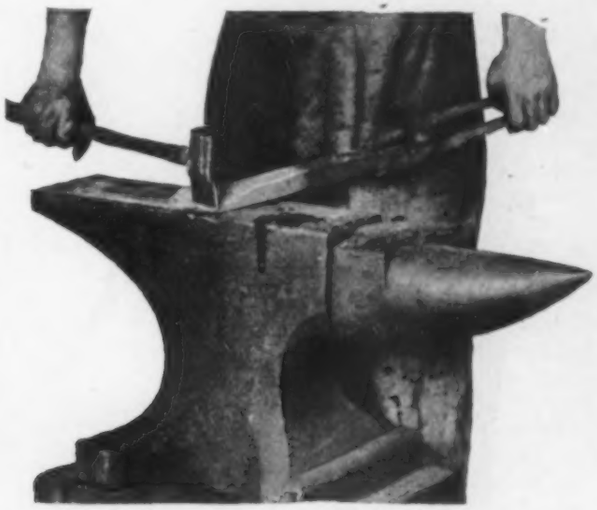


FIG. 52.—CUTTING FRONT CORNERS OFF THE NOSE SO AS TO APPROXIMATE TO THE PROPER CURVE.

[2] IRON TRADE REVIEW, Jan. 24, 1907.

[3] IRON TRADE REVIEW, Jan. 31, 1907.

and one helper or in two heats by a smith and two helpers, the two helpers being required for only a part of a minute.

Bad Practice to Nick the Bar of Tool Steel and Break It off Cold

The practice of nicking the bar of tool steel with a cold chisel at points corresponding to the proper length of the tool, and then breaking it where nicked by a blow of the sledge on the anvil, is on the whole unwise, as not unfrequently almost invisible cracks are started which may only fully develop after the tool is in use. In cutting to length with a "hot chisel" a low heat is sufficient and the same heat can be used for stamping the rear end of the tool for identification.

FIG. 53.—TRYING TOOL AGAINST CONE GAGE TO TEST PROPER ANGLE FOR NOSE.

The following are the steps to be taken in forging the tool after it has been cut to length from the bar.

Heating the Tool.

(A) Heat the tool rather slowly so as to insure uniform heating to the center of the bar, turning it over several times while in the blacksmith's fire. The proper heat with the modern low carbon, high tungsten and chromium steels is as high a heat as can be used without causing the steel to disintegrate or fly to pieces when struck with the sledge. Contrary to all former laws and traditions in heating tool steel, this type of steel is not injured by heating beyond a cherry red in dressing, providing the tool is finally to be heated to the high melting point according to the Taylor-White process. The proper dressing heat varies according to the chemical composition of the tool steel, but is in most cases from a yellow to a light yellow heat corresponding to a temperature of 1,800 to 1,900 degrees Fahr.

In the case of a tool one inch in the body this yellow heat should extend 5½ inches back from its point and in the following description the dimensions given will be understood to refer to a tool of this size.

When several tools of the same shape are to be dressed at the same time, it is best to heat them slowly in lots of, say, four to six tools at a time; the part of the tools to be heated being brought closer and closer to the hot portion of the fire as they are gradually warmed up, while the one particular tool which is to be forged next is kept directly over the hottest part. A clear coke fire, made and kept sufficiently deep to measurably prevent the blast from coming directly in contact with the tool is, on the whole, preferable to the ordinary soft coal fire used by blacksmiths. This is only true, however, because it is, on the whole, easier to get a uniform fire with coke as the fuel than when coal is used in a blacksmith's fire. The experiments described toward the end of this paper show clearly that if sufficient care is used, a first-class soft coal fire oxidizes, and therefore injures, the tools less than a first-class coke fire.

FIG. 54.—NOSE TURNED UP ON THE ANVIL.

Bending or Turning Up the Nose of the Tool.

(B) Clamp the tool down hard on to the top of the anvil, as shown in Fig. 48, by drawing down the clamp C by means of the wedge W, the upper edge of which presses against the lower side of the anvil, and the lower edge against the end of the slot made in the shank of the clamp C, which passes down through a square hole in the anvil and projects below the underside of the same. The tool is clamped so that 2⅜ inches of its end project beyond the edge of the anvil.

(C) The blacksmith and his helper each working with a sledge bend the heated end of the tool down into the position shown in Fig. 49. (The exact shape of tool as thus bent over is shown in Fig. 54.)

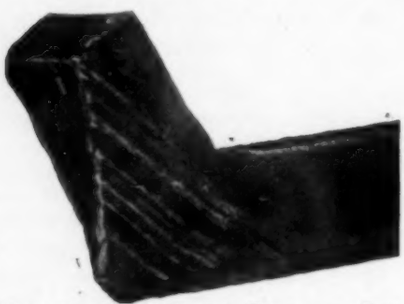


FIG. 55.—HEEL DRAWN DOWN TO GIVE SUPPORT CLOSE UNDER CUTTING EDGE.

A gage similar to that shown in Fig. 53, should be mounted close to the blacksmith's anvil, so that he can readily test the bending of the tool to secure the proper clearance angle.

This gage consists of a small surface plate with a hole drilled near one corner, into which are fitted a series of cones turned to different angles, corresponding to the various shapes into

FIG. 56.—TOOL CUT ROUGHLY TO PROPER LIP ANGLE.

which the tools are to be bent. The tool without removing the tongs is placed with its bottom surface on the surface plate and the clearance surface against the tapered cone, where at a glance the blacksmith can see whether he has bent it to the correct angle. A similar clearance gage should also be mounted close to the tool grinder so that the clearance angle called for in grinding can be quickly and accurately measured by the operator.

Drawing Down the Heel of the Tool to Secure Good Bearing.

(D) The wedge W of clamp C is then loosened with a hammer, and the tool quickly removed to the steam hammer with flat dies, where the curved portion at the heel of the tool is placed, as shown in Fig. 50, upon the edge of the die, and drawn down with

FIG. 59.—END VIEW OF GROUND TOOL, SHOWING NOSE PROPERLY SET OVER TO ONE SIDE.

a few blows of the hammer so as to flatten it into a wedge shape. This flattening spreads the metal out laterally until what was a rounding corner becomes almost a right angle; thus extending the flat surface of the bottom of the tool further forward, so as to furnish a support almost under the cutting edge. (The tool in this condition is shown in Fig. 55).

FIG. 57.—FRONT CORNERS CUT OFF TO APPROXIMATE PROPER CURVE.

In case no small steam hammer is available, the heel of the tool is flattened in a similar manner by sledging upon the blacksmith's anvil.

Cutting Off the Corners of Nose of Tool to Save Grinding.

(E) The tool is placed upon the edge of the anvil, as shown in Fig. 52, and its two corners are cut off with a chisel so as to make its nose approximate to the proper curve. The bottom of the heel of the tool is also trimmed off, if necessary, so as to make it flush with the bottom of the tool. The height is then marked with soapstone or a nick of the chisel upon the nose of the tool for cutting to the proper lip angle, and the tool is returned to the fire for its second heat.

It should be noted that operations B, C, D and E are all done with a single heat. If, however, at any stage in the process through lack of skill or unusual delay the tool is cooled to below a light cherry red, corresponding to a heat of 1550 degrees Fahr., no further forging should be done without reheating.

Cutting to Correct Height and Lip Angle.

(F) After slowly and thoroughly reheating the tool, the upper portion of the nose is cut, as shown in Fig. 51, to the proper lip angles, care being taken to secure both the correct angle and height called for. The use of a specially designed hot chisel or set, as shown, will help the blacksmith in this operation.

Bending or Setting the Nose of the Tool Over to One Side and Truing Up the Whole Tool.

(G) The whole nose of the tool is then bent and set over sidewise through the use of a flatter, as shown in Fig. 59.

(H) The tool should be carefully straightened on the anvil so as to have as nearly as possible a true bearing upon its bottom surface. This bearing should extend all the way from the front to at least half way back on the tool. A surface plate should be

FIG. 58.—DIAGONAL VIEW LOOKING PARTLY DOWN ON THE TOOL AFTER GRINDING.

provided close to the blacksmith's anvil for testing the accuracy of this operation. The importance of having this bottom surface true is not ordinarily appreciated. The tool should bear at all points along its bottom surface, at its forward end, directly underneath the cutting edge, in order to avoid chatter or breaking through too much overhang; directly beneath the clamp to avoid either bending or breaking at this point.

Fire or Heat Cracks in Tools Come From Four Principal Causes.

(A) Seams or internal cracks in the bar of tool steel, caused mainly by imperfections in the ingot or by too rapid or uneven heating in hammering the bar.

Blacksmiths are prone to attribute all cracks in their tools to the maker of the tool steel. It is our observation, however, that nine-tenths of the cracks in tools are due to bad treat-

FIG. 60.—TOOL ABOUT HALF USED UP.

ment in the smith shop rather than to imperfections in the bar.

(B) The second cause for cracking is breaking the bar while cold, as already referred to.

(C) The third cause is heating the bar unevenly by keeping it in the

same position in the fire throughout the time of heating.

The portion of the tool next to the fire expands more rapidly than the steel directly above it, and actually tears the colder metal apart.

(D) The fourth cause for cracks is too rapid heating in an intense fire. Even if properly turned over and over, the outside portions of a tool (particularly if it be of large body) are heated to a high forging heat before the center of the section has reached its proper temperature.

If hammered when in this condition, internal cracks in the tool are likely to be developed, because the center of the bar, instead of being malleable as the outside is, still remains comparatively cold and brittle, and the steel being unable to flow is torn apart, thus producing internal cracks. Internal cracks are also caused in some cases by hammering the outside of the bar with too light taps of the hammer. The force of the hammer blow should be powerful enough to penetrate to the center of the bar and should, therefore, increase with the size of the steel.

It is from the third and fourth causes (C and D) that cracks are most frequently developed and, therefore, slow heating and frequent turning of the bar in the fire are to be recommended, particularly during the early stages of heating. If the heat must be hurried, let it be during the final rise in temperature from the cherry red, say, up to the proper forging heat.

The above remarks refer of course to high speed tools, not to either tempered tools or the old self-hardening tools which should not be heated beyond a light cherry red in forging.

(To be Continued)

A NOVEL FORM OF BORING MILL.

A boring mill without housings or stationary tools is a decided novelty, yet one of this type has been in successful operation for the past year at the works of the Crocker-Wheeler Co., Ampere, N. J. The mill in reality consists of a revolving floor plate with a stationary portion in the center and a stationary floor plate surrounding the revolving portion. It was designed and built by the Crocker-Wheeler Co. for machining the surfaces of field and armature rings of large alternators. The illustration, Fig. 1, shows the tool in operation, facing the interior surface of a stator frame. Fig. 2 is a cross section through the machine.

The tool is so designed and proportioned that medium size work may be clamped upon the revolving portion, while a portable tool post is fastened to the stationary central part. For very heavy work, the tool post is fastened to the revolving surface, while the work itself is clamped to the stationary floor plate surrounding the table. The central portion, the revolving table and the floor plate are all flush, and when the tool post and work are removed the tool presents the appearance of a plain floor surface.

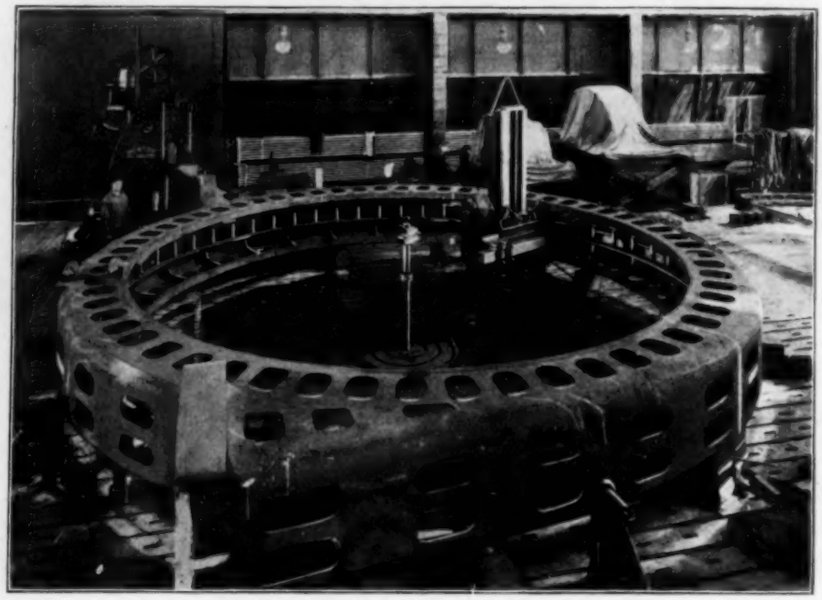


FIG. 1.—FLOOR PLATE BORING MILL AT WORKS OF CROCKER-WHEELER CO.

The construction of the machine is very clearly shown by Fig. 2. The stationary central portion is designated by A. It is supported on concrete piers and so formed as to provide a bearing surface at B on which the movable table C revolves. A raised lip is formed on the bearing B to retain the oil used in lubrication. An auxiliary bearing is provided at D, which normally is not in contact with the table, being separated therefrom by a very small space. A heavy piece of work mounted on the table will deflect it, however, so that this bear-

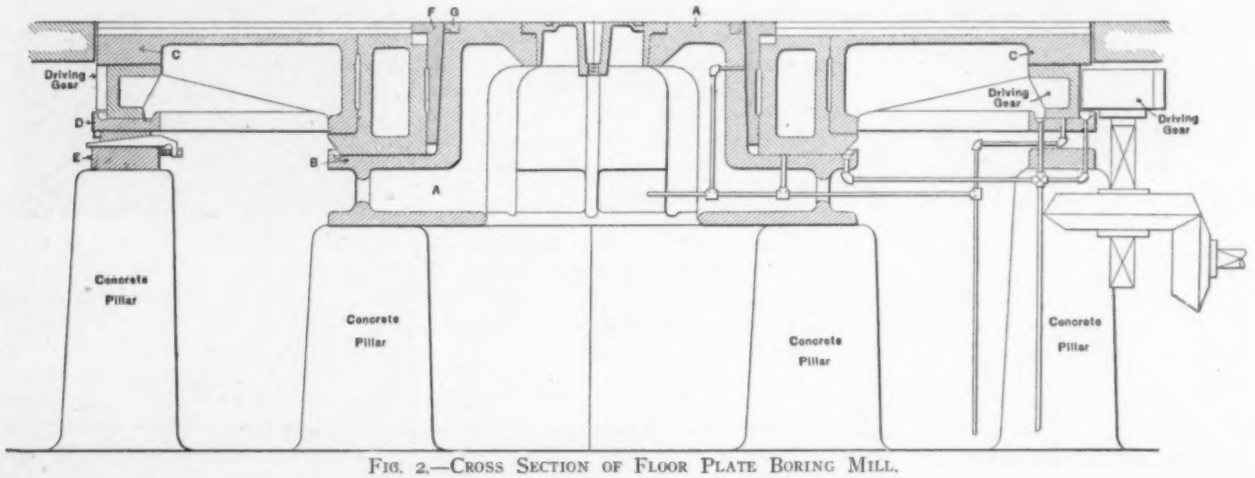


FIG. 2.—CROSS SECTION OF FLOOR PLATE BORING MILL.

ing comes into play and supports the table, thus eliminating any undue springing. This bearing is supported upon a series of concrete piers which carry a ring E upon which are mounted 32 adjusting wedges for the purpose of taking up wear in the bearing. The driving gear has a flange cast upon its lower edge, forming the bearing surface of the revolving table. A taper sleeve F provides adjustment between the stationary central portion and the revolving table. The stationary portion A is tapered, and in conjunction with the taper sleeve, locates the revolving table centrally, the outer surface of the stationary portion and the inner surface of the ring being tapered respectively. A packing ring G prevents chips and dirt falling into the bearings.

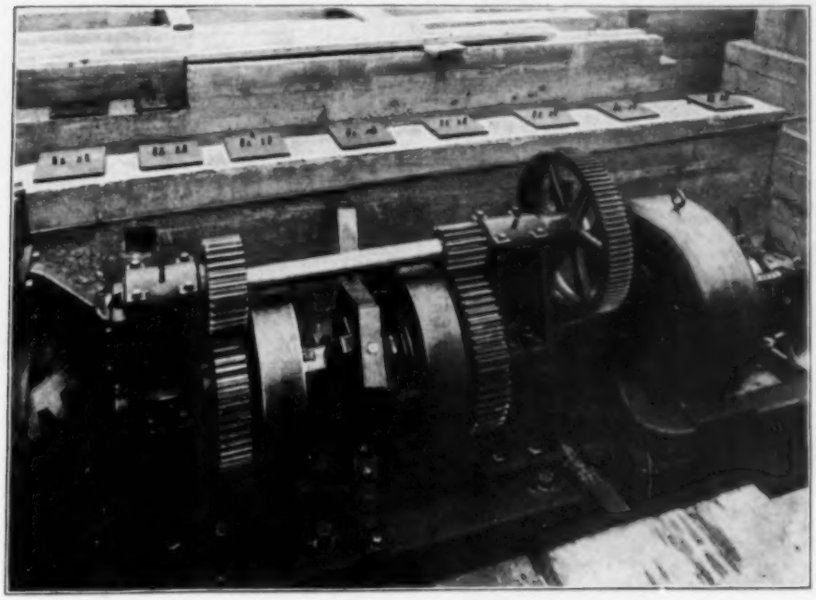


FIG. 3.—DRIVE OF FLOOR PLATE BORING MILL.

The working surface of the revolving portion of the table is formed of 16 sections of surface plates bolted to the stationary portion, and so machined and placed as to form 16 radial T-slots. The separate surface plate form of construction facilitates repairs in case the T-slot edges become broken or the surface worn out of true. The segments are attached to the main revolving portion of the table by bolts whose heads are sunk flush with the surface.

The driving mechanism consists of a gear made in eight sections and bolted to the table in the position shown in Fig. 2. The pitch diameter of this gear is 18 feet and the face of the teeth is ten inches, each tooth being cut from the solid. This gear meshes with a 16-tooth cast steel driving pinion, which is driven in turn through a pair of bevel gears from a 50-horsepower shunt wound motor. Figs. 3 and 5 show the driving mechanism, two changes of speed being possible by the spur gear train. A pair of friction clutches shown in Fig. 3 between the two gears on the lower shaft throw either pair into action as desired. Further changes of speed are obtained by means of the motor which is connected on the multiple voltage system, the connections in the controller giving voltages of 40, 80, 120, 160 and 240 while field regulation provides for the intermediate graduations. The motor is geared to the upper shaft shown in Fig. 3. A total speed variation of from 0.34 to 3.80 revolutions per minute may be obtained by means of this mechanism.

The motor and gear train when first erected were on a concrete pillar which had no connection with the rest of the machine. On heavy cuts, considerable spring and chattering occurred, due, no doubt, to the motor and machine springing away from each other under the heavy pressure. This was removed, to a large extent, by tying together the motor and machine foundations. It is possible that a worm drive instead of the gear drive would have proved more satisfactory in so far as the chattering is concerned. While the worm drive is considered by many to be open to many objections and to possess numerous disadvantages, it is extremely likely that the improved form, such as is found in the more modern planers and slotters would render equally good service in this connection.

The various bearing surfaces are lubricated by means of a forced oil system conveyed through the pipes shown in the illustration. Suitable grooves are provided in the bearing surfaces into which the oil is fed, and from these grooves the oil is wiped over the entire bearing surface. After leaving the bearing surfaces, the oil is filtered and returned to a reservoir and used over again indefinitely.

The cutting tool is carried in a portable tool post built by the Espen-Lucas Co., of Philadelphia and described in THE IRON TRADE REVIEW of December 7, 1905. This tool post is provided with a cross rail, which can be given either a horizontal or a vertical motion by means of

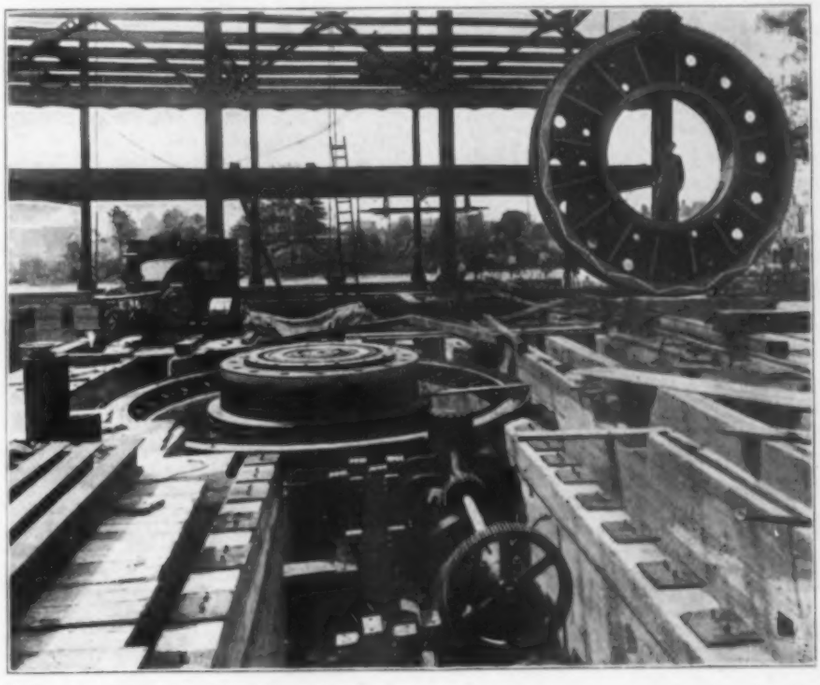


FIG. 4.—FLOOR PLATE BORING MILL BEING ERECTED.

a screw operated by a star feed, this latter being actuated by piers bolted to convenient points on the revolving table.

A machine of this character possesses many advantages. As heretofore mentioned, either the work or the tool may be revolved. When the work is stationary, a tool may be used for boring on the interior, while other machines may be engaged in drilling or other operations on the exterior surface, these machines being bolted to the stationary floor plate. By removing the tool post to one side when there is no work to be machined in the shop, the entire space is available for erecting work, as there are no hous-

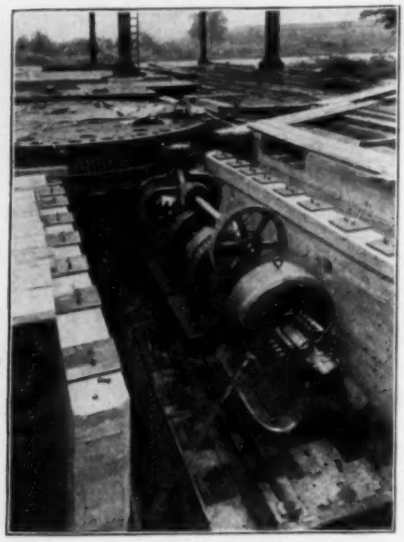


FIG. 5.—RELATION OF DRIVE TO MILL.

ings or cross rails. Work of almost unlimited size may be handled by placing extension plates on the revolving or stationary tables, in order to bring the tool and work into the most advantageous relation.

The machine was designed and built under the direction of Dr. S. S. Wheeler, president of the company. The stationary central casting weighs 32,000 pounds; the revolving table weighs 40,000 pounds, while the total weight of the machine, exclusive of the driving mechanism is 90,000 pounds.

Iron and Steel Institute.—The next annual general meeting of the Iron and Steel Institute will be held at the Institution of Civil Engineers, Great George street, London, Thursday and Friday, May 9 and 10, 1907. The annual dinner will be held under the presidency of Sir Hugh Bell in the grand hall of the Hotel Cecil, May 10. The Council will shortly proceed to award the Carnegie research scholarships, and candidates must apply before Feb. 28. The awards will be announced at the general meeting.

SIGNAL VICTORY

WON BY BUFFALO FOUNDRYMEN IN COURT.

Injunction Against Strikers Made Permanent.—Cincinnati Employers Meet.—Other Labor News.

(Special Correspondence.)

Buffalo, Feb. 1.—In the legal battle for justice which grew out of the Iron Molders' strike at Buffalo, May 2, 1906, the foundrymen have gained an important victory. The case in point is that of the Buffalo Foundry Co. against Frank Wolfe, as president,. and Iron Molders' Union No. 84, in which the foundry company brought suit for damages alleged to have resulted from various acts of the union during the strike. It was shown, among other things, that the company had suffered through the interference of members of the union with its men; that employes could only go to and from their work under protection, and that pickets were constantly stationed about the foundry premises.

The action was begun Oct. 12, 1906, in the special term of the supreme court at Buffalo, and at that time Justice Truman C. White issued a temporary injunction at the instance of the Buffalo Foundry Co. It was ordered that the union and all its representatives cease hindering work of the company, interfering with its men or in any way obstructing the plaintiff's business. With many other provisions the injunction contains the following:

"Unlawfully obstructing, impeding or besetting the streets, alleys, and approaches contiguous to the premises of the said plaintiff for the purpose and in such manner as to intimidate, threaten, impede, obstruct or surround or coerce any employes of said plaintiff or persons seeking employment of said plaintiff; or from in any unlawful manner interfering with such persons in going to and from or in remaining at the works or place of business of said plaintiff, and from unlawfully interfering with any such persons anywhere because of such persons being in the employment of plaintiff or of their seeking to be employed by it, or because such persons failed to join in this present strike; from going into the homes, boarding places or places of habitation of any employe or employes of plaintiff or persons seeking its employment and from directing, aiding or counselling, assisting or abetting any person or organization so to do, with the purpose of intimidating or unlawfully coercing any or all of them to leave the employment of plaintiff or from entering plaintiff's employment and as well from intimidating or threatening in any unlawful manner the relatives, wives and family of said employes at their homes or elsewhere."

The counsel representing the iron molders made a motion before the same justice a few days later to have the injunction order vacated, but after the court had listened to the arguments of the defense, the motion was denied. The next move on the part of the union was an appeal to the appellate division of the supreme court, fourth department. Briefs and affidavits were submitted and counsel for either side argued before the justices sitting in the appellate division. Counsel were advised this week that the appellate division had sustained Justice White in granting the injunction order against the union and in denying the motion to have the order vacated. It is learned further that the justices without an exception concurred in the decision to sustain Justice White. The Buffalo foundrymen feel that a big victory has been gained in the cause of fairness. Much interest was evinced in the proceedings and a good deal of evidence, in the form of affidavits of some twenty-five men, was given during these proceedings. The affidavits were of a sensational nature. They showed in nearly every case how the "open shop" men had been assaulted brutally, that women, who took them as boarders had been subjected to vile language and threatened bodily harm, and in one case it was shown how one molder had been murdered while on his way home from work. It was, therefore, with a large measure of satisfaction that the Buffalo foundrymen, who are fast winning their fight for the open shop, received intelligence of the decision in the case appealed. They feel now that they have the protection of one of the most sweeping injunctions granted in any difficulty of the class to which they have for nearly a year been subjected.

Effective Work Done.

"Actual violence in strikes has decreased from several hundred cases during the first year of the association to five inconsequential acts of violence during the past year," said Secretary Charles F. Waltz of the Employers' Association of Cincinnati at the annual meeting and banquet Jan. 29. "In addition to our work in Cincinnati and vicinity the association is to be congratulated upon the work done during the last session of the Ohio legislature. A more pernicious and destructive set of labor bills could not be found in any legislature in the United States than those introduced during the three months' session, and yet bills of a character that have heretofore never failed to become laws, and backed by a powerful labor lobby and vociferously demanded by all of organized labor of the state of Ohio, did not pass into laws. For the first time in the state of Ohio the labor organizations were met with a strong and determined organization of employers.

"Conditions are more ideal, industrial-

ly, in Cincinnati than in any other city in the country, and that condition is due neither to chance nor to auspicious location, but is almost wholly the result, directly or indirectly, of the efforts of this organization."

The following officers were elected by the association: President, A. H. Pugh; first vice president, William Lodge; second vice president, Samuel Bailey Jr.; third vice president, H. C. Yeiser; treasurer, Dr. J. M. Crawford; directors, J. C. Hobart, Fred A. Geier, H. H. Meyer, M. E. Moch, S. F. Dana, R. R. Reynolds, M. B. Farrin, E. P. Harrison, C. J. Krenhbiel, Harry Suydam and P. P. Hunter.

Labor Notes.

The Burden Iron Co., Troy, N. Y., has notified its men of a general advance in wages. Puddlers are to get an increase of 25 cents a ton. Two thousand men are affected.

Fifty laborers employed at the plant of the Standard Steel Car Co., New Castle, Pa., have gone on strike because their demand for increased pay and shorter hours was refused.

Because they refused to sign a one-year contract presented by the officials of the Red Jacket Mfg. Co., Davenport, Ia., 70 men are out of work. The management has announced that the places of the strikers will be filled by other men and that the plant will resume operation.

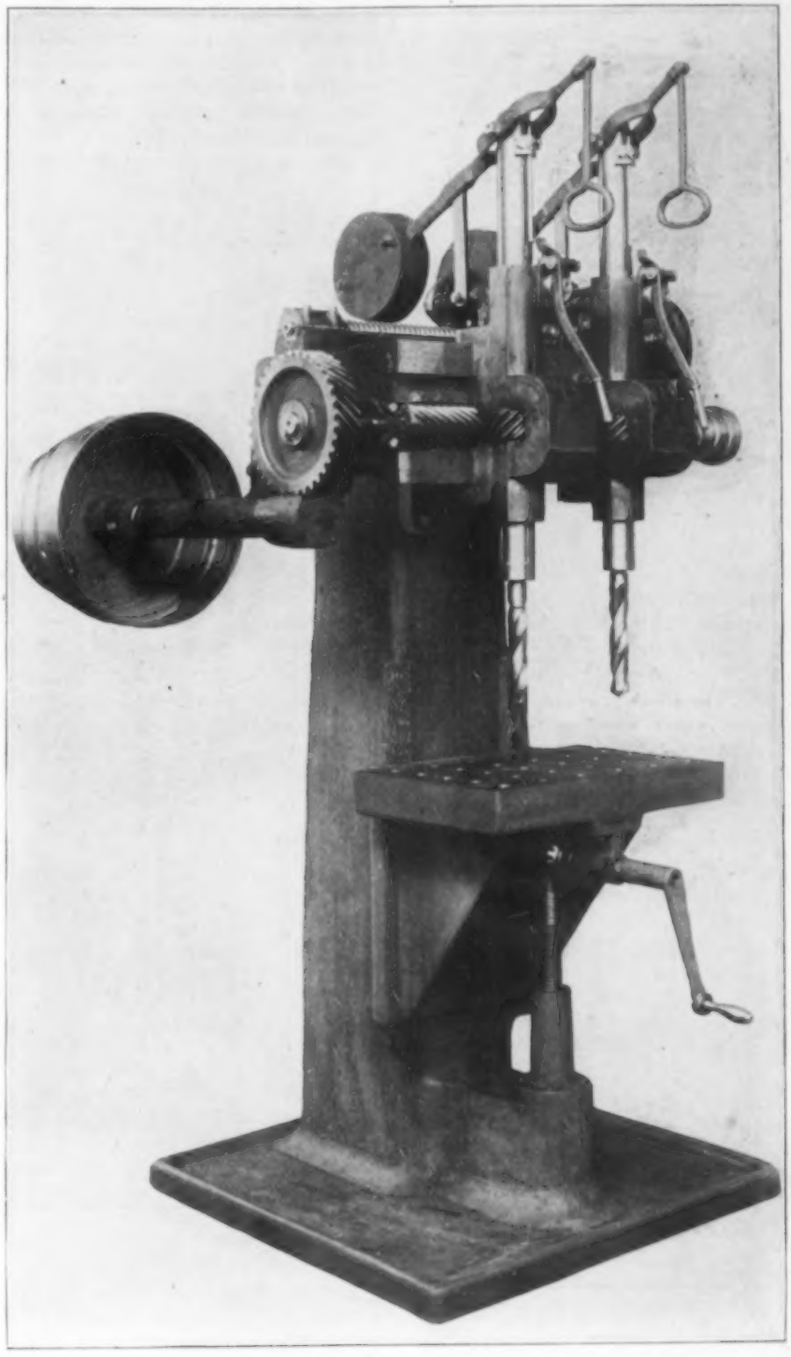
The second trial of Cornelius B. Shea, president of the International Brotherhood of Teamsters, and his associates, charged with conspiracy in the recent teamsters' strike in Chicago, was begun in that city Feb. 2.

The scarcity of labor in the south and the efforts being put forth to relieve it through the channels of immigration lend interest to an action which has been brought by United States immigration authorities against a North Carolina mill owner for alleged violation of the labor contract laws in causing thirty-three English mill operatives to be brought into this country. The case is on trial at Greensboro, N. C., in United States court. The laborers were landed at Philadelphia.

The Wright Mfg. Co., Detroit, Mich., manufacturing steam specialties, including alarm water columns, steam traps, exhaust heads, etc., is distributing a new calendar of the perpetual type. It comprises a rectangular base bearing the name of the company and the photograph of a hooded girl, together with a useful perpetual calendar pad enclosed in an embossed metal frame work. The corners of the base are protected by embossed metal clips.

A NEW GANG DRILL.

The accompanying illustration shows a new gang drill recently developed and put on the market by the Moline Tool Co., Moline, Ill. It is designed to handle two or more 1¼-inch drills in steel.



MOLINE GANG DRILL.

The spindles are adjustable horizontally, and may be brought as close as 5 inches to each other, and on the particular machine shown may be separated a maximum distance of 18 inches. This distance, however, is variable and may be made whatever is desired.

The spindles are driven by spiral gears and have automatic stops and a quick return by means of the counterbalances. Each spindle feed is independent of the other. The table is vertically adjustable on the column. The drive can be arranged either at right angles to the machine, as shown, or parallel. The machine is made for drilling rails and also for doing rapid work in forgings.

The transfer of four mining leases owned by the Pilot Mining Co. has been recorded.

HEAVY STAMPINGS TO REPLACE CASTINGS.

Steel stampings have recently begun to displace iron, brass, malleable and steel castings for a number of uses. The accompanying illustrations, Figs. 1 and 2, show two large stampings of heavy

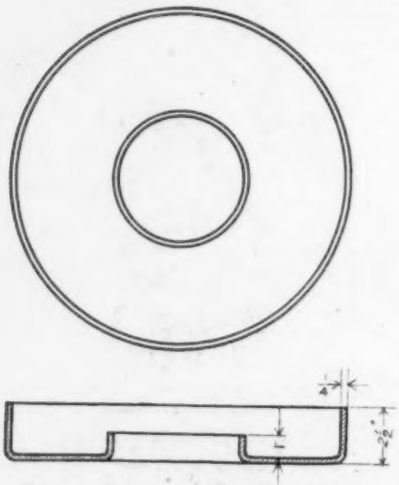


FIG. 1.—STAMPING MADE ON TOLEDO PRESS.

material, and Fig. 3 shows the punch press designed for producing these stampings. The tool is built by the Toledo Machine & Tool Co., Toledo.

Fig. 1 is a stamping from ¼-inch steel plate. The blank required was 20 inches diameter. The stamping is formed and the center cut and flanged in two operations. The outer flange is 2½ inches high and the inner flange 1 inch high.

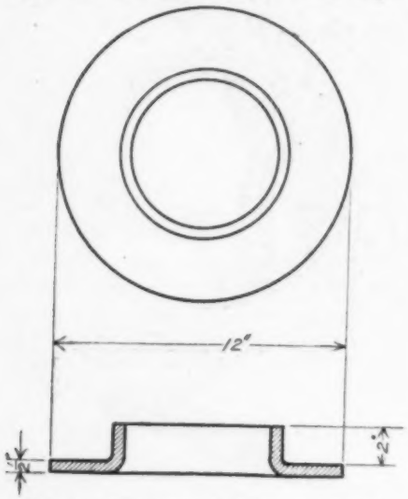


FIG. 2.—STAMPING MADE ON TOLEDO PRESS.

Fig. 2 was stamped from ½-inch plate, and required a blank 12 inches diameter. The center opening was punched and flanged in three operations, the flange being two inches high, as shown.

The press which did this work was built for the Crosby Co., Buffalo, which makes a specialty of producing stampings of this character for a wide range of work. The press has a capacity of 12,000 tons pressure. It is of massive proportions as may be judged from the size of the man standing alongside. The ram is operated by a single pitman driven through a train of spur gears and a jaw clutch. The frame is of cast iron, is made in one piece and weighs 42,800 pounds. The distance from the bed to the slide with adjustment up is 31 inches. The stroke is 14 inches, while the adjustment of the slide is six inches. The crank shaft at the bearing is 13½ inches in diameter. The gearing is massive and powerful, the main driving gear being 92 inches diameter by 14 inches face. Its weight is 9,000 pounds. The proportion of the gearing is 40:1. The press is provided with a fly wheel 60 inches in diameter and weighing 2,400 pounds. The distance from the floor to the top of the large gear is 14 feet 8 inches, and the bed is 37 inches square. The total weight of the machine is 100,000 pounds.

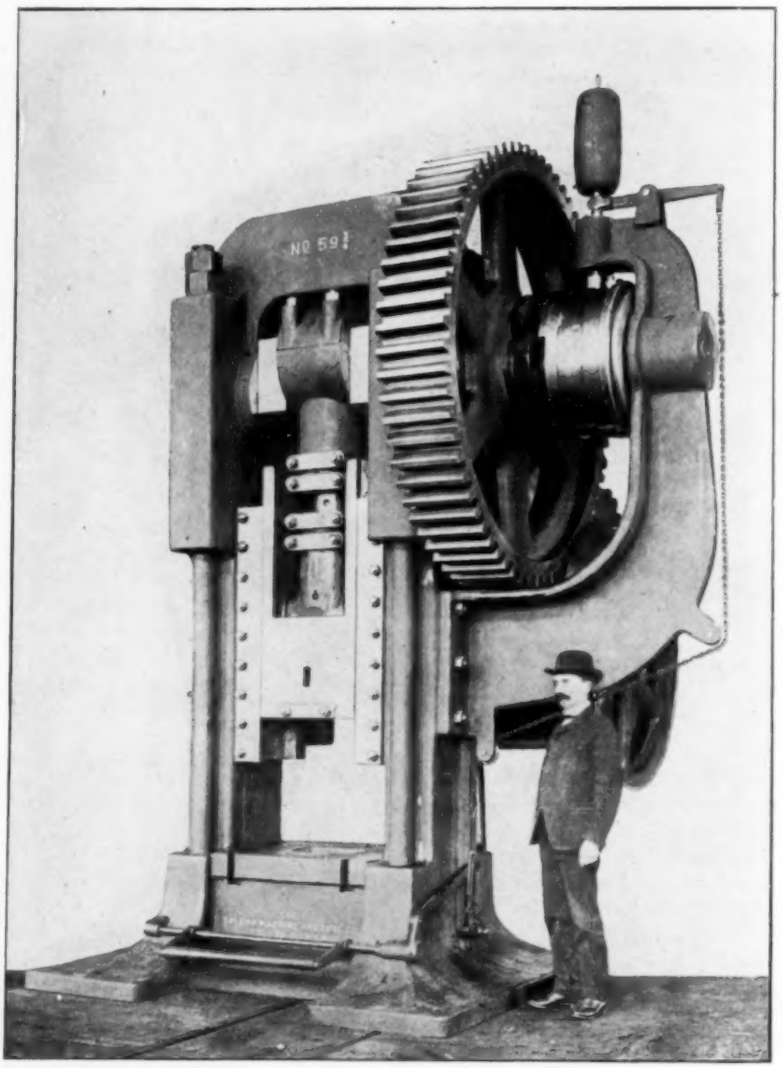


FIG. 3.—TOLEDO PRESS FOR HEAVY STAMPING.

ADOPTS GAYLEY PROCESS.

The Warwick Iron & Steel Co., of Philadelphia, in its annual report, speaking of its efforts to reduce the cost of converting raw material into pig iron, says: "The quickest and least costly method of accomplishing this desirable and necessary end, after most careful and thorough consideration, was the Gayley dry air process, through its adoption to protect our net profits under competitive conditions with furnaces owning raw material, either ore or coke. It is expected that the use of air of uniform moisture throughout the year will so reduce the cost of converting raw materials into pig iron as to more than justify the cost of installation. We hope to have the plant in operation by May or June next." The company's statement shows the net earnings for the year to be $293,243.

Pure iron weighs 0.281 pounds per cubic inch.

LABOR: INDIVIDUAL SHOP ORDERS AND GROUPS OF ORDERS.[1]

By F. E. Webner.[2]

In obtaining costs the ordinary train of thought runs along the channel of shop orders for each individual part. This, however, is not always practical, as the time consumed in recording the labor would become too voluminous and top heavy and any plan of that nature would, as it were, fall of its own weight. Where parts are sufficiently large or are made in considerable quantities at one time, or for any reason the labor thereon will be of such duration as to warrant a specific order, such an order is advisable and best conserves the interests of the management by getting closest to the facts, and all that has been said in previous chapters, or that may follow, presupposes individual shop order numbers for individual parts. Where groups of individual parts or integrants are formed into elements, and such elements are used in common on several different sized machines, it may be permissable to treat the element as a unit, rather than the integrants thereof, if the various integrants are made in such quantities only as are needed for the number of elements ordered. On the other hand, however, if such integrants are made in large quantities for stock to be used in common on other elements, or for any reason whatsoever, then it stands to reason that the cost should be worked out individually. Yet that condition would not necessarily mean that all of the other integrants need be specifically worked out every time the elements are made up for such parts as are in stock can be drawn from the stock room on requisition and charged to the order number as finished parts in contradistinction to raw material.

Cases frequently arise where scrap or waste stock is utilized by being made up into integrants of different kinds, as, for instance, short lengths of bar-iron and steel made into braces, wheel spokes, bolts or kindred uses; clippings from sheet iron and steel made into small sized patterns and again the wood room scrap sawed into such sizes and shapes as prove most economical; incidentally, the latter brings to mind a case in the experience of the writer where wood room scrap was largely used in construction of a cheaply constructed wheel-barrow, and that brought up the point as to what material charges should be applied against that barrow. There are different view points from which to consider that matter and, in fact, the wood room proposition appears superficially to be a difficult one at best, especially where cutters will take a board and, by cutting to advantage, get out of it parts of possibly four or five different machines, together with more or less scrap from which can later be cut parts for other product. When the cutter has finished his day's work he may have produced twenty-five of one part, seventy-five of a second part, twenty-four of a third part, and so on as the case may be. The question naturally arises as to the material charge and the labor charge against each kind of product, and again as to whether the scrap shall be treated at full value, or as valueless entirely beyond the ordinary scrap price. While this article is not to discuss material costs, yet in this instance it may be apropos, especially in view of the fact that the labor proposition is so closely allied. The arguments presenting themselves are first, that the price paid for a hundred square feet of lumber, less a percentage for scrap, is not the proper charge against a shop order primarily using such quantity, for the reason that from the scrap is obtained the parts for other machines involving a higher material value; yet, on the other hand, if such scrap were not utilized the original cost of the lumber would still be there. Secondly, by producing a cheap product from scrap such product is marketed at a low price by reason of its having been made from scrap and if the material is considered at full cost price per foot, then the cheaper article will likely appear to cost more than the selling price thereof. Logically, it would seem that the cost per foot should apply to each and every article of product and while there are pros and cons on the subject, the writer is firmly of the opinion that the cost price per foot is the most equitable basis on which to calculate the cost of the several articles of product, thus enabling the management to draw therefrom any deductions or calculations which it may see fit to do so. There is then a fixed and known basis for further calculation. What applies to the wood room will apply also to any department or class of material, so that the *modus operandi* can be considered common to all departments.

A shop order can be issued covering whatever pieces the cutter is likely to get out of a given kind of lumber over a period of perhaps a week, for ordinarily the week presents a good cleaning up time. For the first two to three days after the plan is instituted the cutter can keep a tab on the average length of time applied on each part of his product and a record can be made by "points" so as to establish a comparative scale whereby labor calculations can be made. To accomplish this end take the largest piece or the greatest labor consuming piece and call it ten points, the next piece by comparison of average time consumed may be eight points, and so on down the line to the least labor consuming piece which may be, for instance, one point. In order to properly account for product or finished parts, a count must of necessity be had of such product or parts. This may be accomplished by physical count or by mensuration in the case of wood parts, or by weight in the case of metal parts. Assume for the moment that we have under consideration wood parts and the product for the week has consisted of 56 parts at ten points, making a total of 560 points—183 parts at eight points making a total of 1,464 points; 79 parts at seven points, making a total of 553 points, and 127 parts at two points each, making 254 points, and all told equalling 2,831 points. The labor cost having been $18 for the week of 54 hours would make the value of one point to be $0.0064, and the time consumed per point to be 1.144 minutes, the former to be used as a basis of labor costs by extending the points on each part as indicated, and the latter to be used as basis of expense burden after the manner to be taken up in a future article. In the case of the labor, the points as indicated multiplied by 0.0064 will exactly equal the wages for the week. The material can be apportioned in like manner, based either on points or the exact measurement of each piece plus a percentage loading to cover waste on actual results as obtained by tests each month.

In cases where stock is removed immediately, or shortly after being cut, care will have to be exercised to remove it by known quantities, so that a record may be maintained. In the case of wood parts, or sheet or bar steel, this can be accomplished by trucks with the sides marked to indicate quantities.

Where shop orders consist of elements there should be some attention paid to time and material used in integrants, even though the information be not used in positive form. In cases where several parts are cut out or otherwise treated at the same time the point system can be used, as also it can be used in any operation where several parts are worked on by one workman who finds it impossible to keep the orders separated, or again where a workman cuts material into any one of a dozen different patterns as the material cuts to advantage. This plan will serve admirably to show the efficiency of the cutter, as it keeps a positive record of what goods are produced out of a given amount of raw material, and establishes comparative figures by which the workman may be judged.

[1]Sixth of a series of articles on Cost Keeping.
[2]Certified Public Accountant Cincinnati.

Railroads Plan Steel Construction.

Steel construction of rolling stock is being sought generally by railroads in the United States at the present time. Experiments along this line which have been conducted by many of the leading systems have in some cases reached a point as to lead to plans for large expenditures for shops suitable to such construction. Among others, the cars are still in the testing stage.

Architect C. Frank Jobson, of Chicago, is preparing plans for a large plant for the manufacture of steel passenger coaches to be built at Pullman for the Pullman Palace Car Co. The plant will comprise a dozen buildings, of brick, steel and concrete, and will have a capacity of 300 coaches a day. The estimated cost is $5,000,000.

Steel construction of all cars as far as possible is being sought by the Harriman lines. In the Sacramento, Cal., shops, under the supervision of Julius Kruttchnitt, director of operation and maintenance, a model car of every kind used by the road is undergoing construction. These models will be thoroughly tested on the system, and should they prove satisfactory, they will be adopted as standard on the lines, and all the future construction will follow their plan.

M. S. Connors, general superintendent of the Hocking Valley and Ohio Central Railway systems, says the day of wooden cars, especially coal cars, is past. All future orders for the companies under his jurisdiction will be for steel underframed cars. The Ralston Steel Car Co., Columbus, O., has recently completed an order of 500 steel underframe coal cars and an order for 3,000 of the same kind of cars is being turned out for the Hocking Valley. The latter will replace a lot of non-air wooden cars which will go out of service during the coming summer.

Raising Blockade.

President James J. Hill has called on the Burlington railroad to help raise the blockade of the Northern Pacific in the Dakotas, and the former road has responded by sending 12 of its heaviest locomotives from the Nebraska division to the Northern Pacific.

Act is Attacked.

The Massillon Coal Mining Co., in a suit filed in the United States court at Cincinnati, Jan. 30, has attacked the validity of the recent order of the Ohio railroad commission regarding the equal distribution of all freight cars, whether the property of the railroads or not. The petition sets up the allegation that the railroad commission's ruling will interfere with interstate commerce and that the commission has not the power to make any ruling affecting interstate commerce. A temporary injunction has been granted and the case will be heard Feb. 25.

Dealers are Blamed.

The state railroad commissioners of North Dakota, in the report of their investigation, state that the car congestion in that state is partly due to unprecedented business development of the country. The responsibility for the fuel shortage is laid partly to the dealers who, it is claimed, hoped to secure lower rates and delayed ordering. The employes of the railroads are criticised for indifference to the urgent conditions in some instances in moving cars. The report shows that the dealers were notified by the companies of danger of freight congestion and ignored the notices. The grain congestion is shown to be a yearly occurrence, and the cause for the present aggravated condition is assigned to the rapid development of the wheat growing area and the lack of terminal facilities.

Car Orders Heavy.

Among the recent car orders that have been placed by the different railroads are the following: Atlantic Coast Line railroad, 1,500 box cars with the South Baltimore Steel Car & Foundry Co.; Great Northern railroad, 500 steel hopper cars and 30 express refrigerator cars from the American Car & Foundry Co.; Atchison, Topeka & Santa Fe has increased a recent order with the National Dump Car Co. for 500 combination stock and coke cars to 2,500 steel under-frame Caswell stock and coke cars of 80,000 pounds capacity; Delaware & Hudson, 1,500 steel under-frame box cars, 1,500 steel under-frame hopper cars and 1,000 steel under-frame flat cars with coal sides, from the American Car & Foundry Co.; Erie, 3,000 self-clearing hopper cars of 100,000 pounds capacity from the Standard Steel Car Co.; Missouri Pacific, 2,500 box cars and 3,000 coal cars from the American Car & Foundry Co., 2,000 box cars from the Mt. Vernon Car & Mfg. Co., and 750 Hart converter cars from the Rodgers Ballast Car Co.; National Railroad of Mexico, 400 wooden box cars, 50 wooden flat cars and 50 wooden stock cars from the American Car & Foundry Co., and 200 Otis steel underframe dump gondola cars from the National Dump Car Co., to be built by the American Car & Foundry Co.; Cananea Yaqui River & Pacific, 75 additional flat cars from the Standard Steel Car Co. The Chicago, Milwaukee & St. Paul is building 1,000 Haskell & Barker ballast cars of 80,000 pounds capacity in its Milwaukee shops. Later 1,000 standard stock cars of 60,000 pounds capacity and 1,000 steel under-frame box cars of 80,000 pounds capacity will be constructed.

Railroad Notes:—

The Chicago & Eastern Illinois railway is extensively enlarging its shop at Danville, Ill., by the construction of additional buildings.

At the meeting of the Little Miami railroad stockholders at Cincinnati, Jan. 29, an increase in the capital stock from $2,000,000 to $10,000,000 was authorized.

The employes of the entire Southern Railway Co.'s system have received back pay from Sept. 1, 1906, at the rate of 20 cents per day, on account of the increase of wages given the machinists effective four months ago.

The Erie railroad during February will have its equipment increased by the delivery of 500 flat cars, 500 produce cars and 500 drop-end gondolas. Its mail and express facilities have been considerably increased of late.

Coal dealers supplying the Burlington road with fuel have advanced the price of coal for that railroad 20 cents a ton and it is feared by other western lines that the increase will be extended to them. The increase to the Burlington expense account for fuel will be in excess of $1,000,000.

New freight car repair shops are to be built by the Hocking Valley railroad to cost between $50,000 and $60,000, and an offer of the citizens of Logan, O., to purchase and present to the company 50 acres of land, as a site for the new shops, practically disposes of the question of their location. The company already has small repair shops at Logan.

Improvements and extensions now nearing completion at the West Milwaukee shops of the Chicago, Milwaukee & St. Paul system will make the plant one of the largest locomotive and car manufactories among American railroads. The wheel foundry will have a capacity of turning out 600 wheels a day. The new extension to the car department shops enables it to produce daily 28 box cars of the largest type.

The work of the committee of the Pennsylvania Railroad Co. on freight car economy, which has been going on since last October, will soon be finished on the lines west of Pittsburg. The construction, cost, operation, repairs, life and general and specific usefulness of freight cars is being thoroughly investigated and the results of the investigation will be incorporated in a report to the general headquarters.

Abnormal Conditions Continue in Stocks.

Another week of abnormal conditions was witnessed in the stock market. Without any apparent news developments to warrant this weakness, the market displayed the same downward tendency which has been the course of its movements for nearly two months. Prices rallied at the end, exercising a steadying influence, but the brief cessation of decline is not looked upon with especial encouragement by investors. A new low point for the downward swing of prices since the severe decline in the stock market consequent upon the San Francisco disaster was reached on Friday. The future of the market as well as the causes for the present general slumping is still as baffling as ever to students of price movements. Business over the country continues splendid and time money can be obtained for long periods at 5½ per cent. Yet, inconsistent as it may seem from these conditions, an incessant market liquidation has continued affording one general cause at least for the market's weakness. There is indicated in the results an organized bear party in the trading, possessing extensive resources and aggressive and skillful leadership. Money conditions continue fairly easy, especially for call loans. In some authoritative circles it is stated that three-quarters of the railroad financiering is over. There has been an engagement of gold in London for import to New York which is the reverse of that which ordinarily exists at this time of the year and goes to show the abnormal conditions which prevail. The New York bank statement was not a good one, reporting an increase of nearly $12,000,000 in loans and $501,600 in reserve. The surplus is, however, $12,634,100 slightly in excess of the corresponding period of last year. The week's trading in the New York stock exchange amounted to 6,277,200 shares. United States Steel was active with sales of 796,400 common and 70,400 preferred. Steel stocks generally reflected the downward trend of quotations and showed losses over the previous week's level.

Financial Notes:—

Among the recent dividend declarations are the following: Buckeye Steel Castings Co., regular quarterly dividend of 1 per cent on common and 1½ per cent on preferred stock and a special dividend of 2½ per cent on common stock; Pittsburg Valve Foundry & Construction Co., a dividend of 1¼ per cent, payable March 1. The former dividend was 1 per cent.

The annual meeting of the stockholders of the Empire Steel & Iron Co. will be held at Jersey City, N. J., Feb. 27. Books close Feb. 6 and re-open Feb. 28.

The annual meeting of the Pressed Steel Car Co. will be held Feb. 20 at Jersey City to elect directors and transact other business.

THE LEADING INDUSTRIAL SECURITIES.

	Closing Quo. Feb. 2	Changes In Week	Date 1907 Ann. Meet.	Stock Outstanding	Dividend Basis	Dividend Being Paid	Dividend Date Last Div. Pay.
Allis-Chalmers	14¼	— ⅝	Sept. 5	19,820,000			
Allis-Chalmers pr	37⅝	—1⅝		16,150,000	7 cum		Feb., 1904
American Can	5	.....	Feb. 5	41,233,300			
Am. Can pr	51	—2		41,233,300	7 cum	5 Q.	Jan., 1907
Am. Car and Fdy	42⅜	— ⅜	June 27	30,000,000		½ Q.	Jan., 1907
Am. Car and Fdy pr	101	—1		30,000,000	7 n. c.	7 Q.	Jan., 1907
American Loc	71	—1	Oct. 5	25,000,000		1¾	Feb., 1907
American Loc. pr	111	.....		24,100,000	7 cum	7 Q.	Jan., 1907
American Ship	77¾	—1½	Oct. 2	7,600,000	6	1 Q.	Dec. 1906
American Ship. pr	107	.....		7,900,000	7 n. c.	1¾ Q.	Jan. 1907
Am Steel Foundries	9⅝	— ⅝	Oct. 1	15,810,000			
Am. Steel Foundries pr	42⅝	—2¾		17,240,000	6 cum		Aug., 1904
Barney & Smith	70	—1	June 4	2,000,000	4	4	Dec., 1906
Barney & Smith pr	138	.....		2,500,000	8 cum	8 Q.	Dec., 1906
Bethlehem Steel	18¾	— ¾	April 2	14,862,000			
Bethlehem Steel pr	56	—5		14,908,000	7 n. c.	3 Q.	Feb., 1907
Cambria Steel	43¼	—3	Mar. 19	45,000,000*	6	3 Q.	Feb., 1907
Cambria Iron	48⅝	.....		8,468,000*	4	18 A.	Oct., 1906
Chicago Pneumatic Tool	59	.....	Feb. 18	6,145,800	4	4 Q.	Jan., 1907
Colorado Fuel	47	—4	Oct. 21	30,132,000			Apr., 1902
Crucible Steel	11	— ¼	Oct. 16	24,578,400			
Crucible Steel pr	77	— ¼		24,436,500	7 cum	6	Dec., 1906
Empire Steel	7	+2	Feb. 27	2,281,400			
Empire Steel pr	47	.....		2,500,000	6 cum	3 S. A.	July, 1906
Fay & Egan	95	.....	Feb. 19	1,000,000	6	6 Q.	Nov., 1906
Fay & Egan pr	128½	.....		1,000,000	7 cum	7 Q.	Nov., 1906
General Electric	158	— ¼	May 14	54,356,000	8	8 Q.	Jan., 1907
Harbison-Walker	12½	.....	Jan. 21	18,000,000	6		
Harbison-Walker pr	74¾	+ ¾		9,800,000	6 cum	6 Q.	Jan., 1907
International Pump	34	—3	June 4	17,762,500		2	Apr., 1905
International Pump pr	78¼	.....		11,350,000	6 cum	6 Q.	Feb., 1907
Lackawanna Steel	60	—11	Mar. 13	34,971,400			
Lake Sup. Corp	14	.....	Oct. 2	40,000,000			
New York Air Brake	135	—2¾	June 18	10,000,000	8	8 Q.	Jan., 1907
Niles-Bement-Pond	130	.....	Feb. 6	5,000,000	6	6 Q.	Sept. 1906
Niles-Bement-Pond pr	105	.....		2,000,000	6 cum	6 Q.	Dec., 1906
Otis Elevator Co	50	.....	March 18	6,350,300		2 A.	Apr., 1906
Otis Elevator Co. pr	94	.....		6,308,500	6 n. c.	6 Q.	Jan., 1907
Penn. Steel	66	—3	May 13	10,750,000			
Penn Steel pr	104	+4		16,500,000	7 n. c.	7 S. A.	Apr., 1906
Pittsburg Coal Co	16¼	+ ⅛	Feb. 11	29,045,400			Nov
Pittsburg Coal pr	56	—2⅝		30,217,700	7		Apr., 1905
Pressed Stl Car	48	—4⅜	Feb. 20	12,500,000		3	Aug., 1904
Pressed Stl. Car pr	99	— ⅛		12,500,000	7 n. c.	7 Q.	Feb., 1907
Pullman	168½	—3⅞	Oct. 17	100,000,000	8	8 Q.	Feb., 1907
Railway Stl. Spring	51¼	—2¼	Mar 7	13,500,000		4 S. A.	Oct., 1906
Railway Stl. Spring pr	97⅝	— ⅛		13,500,000	7 cum	7 Q.	Dec. 1906
Rep Iron & Steel	34	—3¼	Oct. 9	27,191,000			
Rep. Iron & Steel pr	96¾	—1½		20,416,900	7 cum	7 Q.	Jan., 1907
Sloss-Sheffield	69½	—3¼	Mar. 5	10,000,000	5	5 S. A.	Oct., 1906
Sloss-Sheffield pr	102	.....		6,700,000	7 n. c.	7 Q.	Jan , 1907
Tenn. Coal & Iron	160	.....	May	22,553,600	4	4 Q.	Feb., 1907
U. S. Pipe & Fdy	46	—1	June 26	12,500,000	4	4 Q.	Dec., 1906
U. S. Pipe & Fdy. pr	87	.....		12,500,000	7 n. c.	7 Q.	Dec., 1906
U. S. Steel	43⅜	—2	April 15	508,302,500	2 n. c.	½ Q.	Mar., 1907
U. S. Steel pr	105⅛	— ⅝		360,281,100	7 cum	7 Q.	Feb., 1907
U. S. Steel 5's	98⅝	— ⅜		463,798,000	5	5 A.	
Va. Iron, Coal & Coke	90	+ ¾	Sept. 17	8,641,600			
Westinghouse Elec	150	—3½	June 26	20,996,350*	10	10 Q.	Jan., 1907
West'ghouse Air Brake	155	—1	Oct. 1	11,000,000*		22½ Q.	Jan. 1907

Par value of shares, $100, except those starred, $50.

The board of directors of the Jeffrey Mfg. Co., Columbus, O., has authorized the issue of $300,000 of 6 per cent preferred stock, which has been taken by the stockholders at par. The issue is a part of the $3,000,000 issue authorized by the stockholders at the last annual meeting.

Up to the present time 81 corporations have declared dividends for February payment, the total of which will amount to $22,408,935. The interest disbursements for the month of 229 corporations will amount to $29,809,904, making a total of $51,218,839.

In its annual report for the year ended Dec. 24, 1906, the American Pipe Mfg. Co. shows net earnings of $618,043, an increase of $129,374 over last year. The dividends paid by the company involved $480,000, an increase of $127,518 over those disbursed in 1905 which aggregated $352,482. The general balance sheet at the end of the year shows total assets of $7,477,344, including $525,744 in cash on hand and $1,269,653 in bills receivable.

During the past year New Jersey chartered 483 concerns to build and operate industrial plants within its limits, their authorized capital stock being slightly less than $72,500,000. To this amount $4,432,000 was contributed by engine, motor and machinery building concerns.

NEWS FROM MANY INDUSTRIES.

New Buyers:—

The Sandusky Foundry & Machine Co., Sandusky, O., has increased its capital stock from $50,000 to $100,000.

The American Metal Specialty Co., Chicago, has been organized with a capitalization of $2,500 by Benjamin Samuels, Hiram R. Glick and I. B. Lipson.

The Davis-Forrest Machine Works, Savannah, Ga., has been incorporated with a capital stock of $20,000 by Thomas J. Davis, George F. Forrest and William V. Davis.

The Champion Lever Machine Co., Indianapolis, Ind., has been organized with a capitalization of $100,000 by James M. Woods, John C. Baird and William Harris.

The Oostburg Steel Foundry Co., Oostburg, Wis., has been organized with a capitalization of $25,000 by Peter Daane, Jacob Fuhrmann and Walter H. Sprangers.

The Fred J. Swaine Mfg. Co., St. Louis, Mo., has been organized with a capitalization of $100,000 by Fred J. Swaine Sr., Charles A. Swaine, Fred J. Swaine Jr. and others.

The Waugh Machine Co., Gahanna, O., has been incorporated with a capital of $12,000 by Johnson S. Waugh, George F. Ebner, Leo Miller, David L. Stygler and Peter Swickard.

The Birkmays-Rodemich Shovel Co., Toledo, O., has been incorporated with a capital of $100,000 by Rudolph I. Birkmays, John L. Rodemich, John Leo Showel, John C. Rodemich and Frank W. Showel.

Cypress Hills Iron Works Brooklyn N. Y., has been incorporated with a capital of $500 by David A. Linsky and Bessie Linsky, 341 Railroad avenue; Hymand M. Granoff, 552 Luther avenue, all of Brooklyn.

The Avoca Wheel Co., Avoca, N. Y., has been incorporated with a capital of $100,000 to manufacture motors, engines, machines, etc. The incorporators are: John J. Ellis, M. J. Ellis, H. Wilmont Smith and others.

The Ziegler Mfg. Co., Columbia, S. C., has been incorporated with a capital of $12,000 to manufacture cement-stone molding machines. J. A. Summersett, office 800 National Loan & Exchange Bank building, is general manager.

The Lyman Mfg. Co., Buffalo, N. Y., has been organized with a capitalization of $10,000 by Richard R. Lyman, Vreeland B. Lyman and John D. Squiers. The new company will manufacture metal specialties and devices.

The Rome Wire Die Co., Rome, N. Y., has been incorporated to manufacture diamond dies and machinery. The capital stock is $5,000, and the incorporators are Oliver Shiras, Herbert T. Dyett, James A. Sprague and others.

The Ideal Fence Tool Co., Abingdon, Ill., has been incorporated with a capital of $2,400 to manufacture and sell gates, wire fence, tools, etc. The incorporators are James A. Clements, Charles W. Robertson and James W Hunter.

The Birmingham Car & Mfg. Co., Birmingham, Ala., has been incorporated to manufacture cars of various kinds. The authorized capital stock of the new company is $100,000, and the incorporators are C. Ellic Foust, Eugene Fies, T. A. Burbridge and Glen C. Brown.

The Veneer Machine Co., Grand Rapids, Mich., has been incorporated for the manufacture and sale of machinery. The capital stock of the company is $35,000, and the incorporators are E. P. Tietsort, A. W. Hompe, R. W. Irwin, George E. Allison, Alfred A. Dennis and John L. Buchanan.

The Magnolia Machine Works, Magnolia, Miss., has been incorporated with a capital of $10,000 to manufacture, buy, sell and deal in all kinds of machinery, power equipment, etc. The incorporators are L. E. Schilling, E. T. Asbury, W. M. Dean, E. C. Schilling, of Magnolia, and W. A. Schilling, of Summit, Miss.

The Diamond Smokeless Furnace Co., Akron, O., has been incorporated with a capital of $20,000 by Walter Kline, C. E. Alexander, W. E. Dean and W. A. Martin. The furnace is of new design and it is believed will meet requirements now demanded to prevent smoke. The company expects to have the furnace manufactured.

The Harwood Mfg. Co., Brooklyn, N. Y., has been organized with a capitalization of $100,000 to manufacture hardware, machinery, tools, etc. The incorporators are: Charles E. Orr, 105 Garfield place; Clarence Le Suer, 674 Willoughby street; Charles H. Katton, 674 Warren street, all of Brooklyn, and George H. Howell, 2718 Avenue G, Flatbush, L. I.

New Construction:—

The Standard Chain Co., St. Marys, O., is building a large addition to its plant.

The Elite foundry, Lake, Wis., has made an extension to its plant, including a warehouse and pattern shop.

The Weller-Christopher Co., Birmingham, Ala., has purchased a site and contemplates the erection of a large foundry and machine shop.

The Acme Mfg. Co., Louisville, Ky., has prepared plans for the erection of a foundry 175 x 180 feet, in addition to a pattern room.

The Boynton Mfg. Co., Keokuk, Ia., recently incorporated, is planning the erection of a foundry. J. F. Boynton and others are the incorporators.

Work has commenced on the construction of ten new finishing mills projected for the LaBelle Iron Works at Steubenville, Ohio. Three buildings will be erected, each 60 x 200 feet.

Additional property has been purchased by the Champion Machinery Co., Joliet, Ill., upon which it will erect a new foundry for the manufacture of castings for its own use.

Work on the new foundry plant of the Benton Harbor Malleable Iron Foundry, Benton Harbor, Mich., will soon be started. About $20.000 will be expended.

The Gardner Machine Works, Gardner, Mass., builder of chair machinery, has purchased land on which it will erect an addition 40 x 60 feet, which will enable a doubling of capacity.

The Ruggles Machine Co., Poultney, Vt., is planning extensive additions to its plant. It has been voted to increase the capital stock from $16,000 to $50,000 and to install new machinery

The James Ohlen & Sons Saw & Mfg. Co., Columbus, O., has employed an engineer to prepare plans for an extension of its present plant and to investigate and report on the most feasible power.

The Falk Mfg. Co., Milwaukee, founder, superintending machinist and railroad contractor, has increased its capital from $500,000 to $750,000. Extensive improvements have recently been made and the equipment later will be extended.

The Maryland Rail Co., Cumberland, Md., is doubling its present capacity. All equipment has been purchased. At a meeting Feb. 7 an increase in the capital stock from $75,000 to $100,000 will be considered. H. H. Dickey is president.

The Whitin Machine Works, Whitinsville, Mass., manufacturer of cotton machinery, has begun the erection of an additional foundry to its plant 200 x 500 feet. There will be four cupolas with a capacity of melting 200 tons of iron daily.

The Jones & Lamson Machine Co., Springfield, Vt., is planning a large addition to its plant. The company manufactures screw cutting machines, turret lathes and mechanics' tools. It is now working day and night to keep up with business.

William Resor & Co., foundrymen of Cincinnati, whose plant was recently heavily damaged by fire, are now clearing the site preparatory to the erection of a new building. The structure will be of brick and stone, five stories, 160 x 350 feet.

The Van Buren Foundry, Van Buren, Ark., recently destroyed by fire, has prepared plans for rebuilding. It is proposed to erect an L-shaped building, 30 x 32 x 127 feet and to expend about $35,000 in building and equipment. James Morrell is proprietor.

Architects are preparing plans for a factory to be built for the Marshall & Huschart Machinery Co., Chicago, Ill. The building will be eight stories, 80 x 133 feet, of reinforced concrete construction, and will cost $150,000. Plans are expected to be ready about March 2.

The Beaumont Iron Works, Beaumont, Tex., manufacturer of logging cars, is arranging for the erection of additional buildings. It is also proposed to begin the manufacture of standard cars used in freight service. O. B. Greeves is president of the company.

The Jeffrey Mfg. Co., Columbus, O., has let the contract to Nichols & Carr of Columbus, for the erection of a new office building to its plant. The offices of the general superintendent and the superintendent of the various departments of shop work will be located in the building.

The Ajax Forge Co., Chicago, Ill., is having plans prepared for an addition to its plant 120 x 130 feet, with concrete foundation, of brick and steel construction to cost $25,000. The Ajax company has also acquired an additional large tract of land, 170 x 222 feet, near its present plant.

The Sutherland Coal & Coke Co. is building a coal and coking plant at Dorchester, Va., which will have an annual coke capacity of 150,000 tons. In addition to the plant it is proposed to erect a large number of workmen's and superintendents' houses. John A. Esser is general manager.

The Nute Foundry Co. Cuyahoga Falls, O., recently incorporated, states that it will take over the business of the T. C. Nute Foundry Co., Akron, O., and that a plant 80 x 150 feet, equipped with a 10-ton electric crane and all modern improvements, will be erected at the former place.

The Mueller Machine Tool Co., Cincinnati, O., has commissioned architects Tietig & Lee, of that city, to draw plans for a new factory 60 x 150 feet of brick and steel construction. The company is now located in the bottoms, and will abandon its present site when the new plant is completed.

Work on the new plant of the United States Cast Iron Pipe & Foundry Co., at Scottdale, Pa., will be started at once. When completed the plant will be one of the finest in western Pennsylvania for the manufacture of cast iron pipe. The main building will be 100 x 638 feet and will have several wings and annexes.

Contracts have been let by the National-Acme Mfg. Co., Cleveland, O., maker of automatic screw machines, screws and special mill work, for the erection of an addition 400 feet long, six stories, of brick and steel construction. It is expected to have the new building ready for occupancy July 1.

The Standard Steel Car Co. has prepared plans for an extensive plant at New Castle, Pa. Four buildings will be erected, the largest of which is to be 1,100 feet in length. Machinery will be installed for the manufacture of motor trucks and the assembling of steel car frames, greatly increasing the present output.

The Minneapolis Steel & Machinery Co., Minneapolis, Minn., reports that its contemplated addition consists of an erecting floor 60 x 203 feet and 50 feet high, to be equipped with a 30-ton traveling crane, which has been ordered from Pawling & Harnischfeger, Milwaukee, Wis. No additional equipment is contemplated at this time.

The directors and officers of the Quad Stove Mfg. Co., Columbus, O., were reelected at the annual meeting. The officers are: George B. Donovan, president; A. W. Hershey, vice president; John Armstrong, secretary and treasurer. The business of the company has outgrown its present quarters and a site has been purchased on West Second avenue on which a new factory building, 50 x 200 feet, will be erected.

The Trinidad Foundry & Machine Co., Trinidad, Colo., has recently been organized with a capitalization of $50,000 and will manufacture mine cars, mine equipment and machinery castings. Within a few months it will increase its present capacity by the erection of a foundry, 64 x 128 feet, and a machine shop 54 x 128 feet, which will be equipped with modern machinery. Those interested are: Merdo MacKenzie, J. C. Hudelson, W. M. Rapp and F. J. Radford.

The Kalla Mfg. Co., New York, which was recently incorporated with a capitalization of $50,000, is to erect a plant at St. George, N. J., for the manufacture of Kalla's combination carpenters' plane and other tools. Iron and woodworking machinery will be required by the company. Those interested include the following: Alexander Kalla and Joseph Cibulas, 187 East Seventh street, and Orlando J. Hackett, 49 East Twelfth street, all of New York.

The Bonny-Floyd Co., organized recently, with a capital stock of $100,000, to erect a plant in Columbus, O., for the manufacture of steel castings, will soon award contracts for its first structure, the converter building. The building will be of steel construction, 90 x 132 feet. It will include between 7,000 and 8,000 square feet of molding space. The company expects to commence operations in May. The other buildings to be erected later are the office building and the cleaning and shipping building.

The St. Louis Malleable Casting Co., St. Louis, Mo., has let contracts to double the capacity of its building at 7701 North Conduit avenue. Specifications call for buildings 60 x 320 feet and one 80 x 120 feet, to cost $25,000. Arrangements have been made for 250 additional men by March 15. Two melting furnaces with an increased capacity of at least 25 tons a day and six annealing ovens to handle the increased tonnage will also be built. Other necessary equipment will be required. The company has elected the following officers: George J. Kobusch, president St. Louis Car Co., president; Hy. Luedinghaus, vice president, and Charles G. Ette, secretary and treasurer.

General Industrial Notes:—

The Madison Avenue Foundry Co., Cleveland, has changed its name to the Madison Foundry Co.

The Angola Furnace Co., Angola, Ind., has moved its plant to Decatur, Ind., and has changed its name to the Decatur Furnace Co.

A certificate of increase of capital stock from $1,000,000 to $1,500,000 has been filed with the secretary of state of New Jersey by the Commonwealth Steel Co., of St. Louis.

Owing to the death of its president, the Watt Mining Car Wheel Co., Barnesville, O., has elected the following officers: J. W. Watt, president and treasurer; S. Watt, vice president and superintendent, and P. H. Laughlin, secretary and general manager.

At the annual meeting of the Hamilton Steel Co., which was held at the company's headquarters at Boston, Mass., Jan. 19, the following officers were elected: President, Frank Hamilton, of Bradford, Pa.; vice president, George E. Mace; secretary and treasurer, R. W. Beul.

At the annual meeting of the Alliance Foundry Co., held at Alliance, O., the board of directors was elected as follows: W. H. Kelly, W. F. Doyle, John M. Kelly, Fred Bogner and S. H. Hommel. W. H. Kelly was elected general manager, and W. F. Doyle, secretary and treasurer.

The Falls Machine Co. Sheboygan Falls, Wis., states that while the plans for its new plant have not been completed, it is expected to double the present capacity and erect a modern plant.

A foundry to cost between $25,000 and $30,000 will be built. It is planned to erect a machine shop later.

The report that the plant of the Troy Steel Co., acquired some years ago by the United States Steel Corporation, is to be dismantled has arisen from the fact that a modern blooming mill, a part of the Troy equipment, is being transferred to Chicago where additional capacity of this sort can be conveniently operated. The Troy works have long been idle.

The statement is made that no decision has been reached in regard to the future of the Star works of the American Sheet & Tin Plate Co., at Pittsburg, an eight mill plant which has not been operated since the first of the year. The plant is one of the oldest operated by this constituent of the United States Steel Corporation, and the report has been current that it is to be abandoned.

At the annual meeting of the Case Mfg. Co., Columbus, O., the old directors were re-elected as follows: E. K. Stewart, J. H. Roys, T. M. Livesay, H. B. Stewart and H. S. Waite. The board will meet later and elect the old officers. They are: E. K. Stewart, president; H. S. Waite, vice president and general manager; H. B. Stewart, secretary, and J. H. Roys, treasurer. The plant is receiving a large number of orders for electric cranes.

The Alliance Machine Co., Alliance, O., at its annual election in Cleveland, re-elected the old board of directors consisting of W. J. Fennerty, G. W. Shem, M. S. Milbourn and W. J. Purcell. The directors elected the following officers: W. J. Purcell, president; W. J. Fennerty, vice president; G. W. Shem, secretary, and M. S. Milbourn, treasurer. The directors decided to push the contemplated extensive improvements to the plant.

The Columbus Structural Steel Co., Columbus, O., is equipping its plant for the operation of its riveting and other large machines. A new large saw, capable of operating on 24-inch I beams, is also being put in. The company is running to its full capacity and has had to turn down a number of large contracts recently. The annual meeting of the company was held Feb. 6. No extensions are planned for this year.

The Wesco Supply Co., St. Louis, Mo., has purchased the entire factory of the Davis Electric Mfg. Co., Springfield, Mass., including raw and finished materials. The factory has been moved to St. Louis and installed in the company's plant at Eighth street and Clark avenue. The Wesco Supply Co. will continue the manufacture of the Davis switch and all other specialties, in addition to its own line of telephone accessories.

The Chase Foundry & Mfg. Co., Columbus, O., announces that it has discontinued the soliciting of repair and structural iron work, and that its entire plant will hereafter be devoted to the manufacture of industrial trucks and cars. The company commenced to make cars for brick yards several years ago, and this branch of the business has had such a rapid growth that the plant is now given over entirely to it. No extensions are contemplated.

Judge Bradford, of the United States court, Wilmington, Del., has made a decree, with certain stipulations, agreeing to confirm the sale of the plant of the Diamond State Steel Co., to John B. Newkirk. The purchaser is ordered within 30 days to pay the balance due on the purchase price, $517,500, of which $57,500 has been paid. He is given permission, in lieu of making the full payment in 30 days, to pay $167,500, and at the same time execute a bond, with two sureties, in the sum of $400,000, conditioned that he pay the entire amount when required by the court to do so.

At the annual meeting of the stockholders of the Guerber Engineering Co., Bethlehem, Pa., Jan. 29, the following directors were elected: A. N. Cleaver, Owen F. Leibert, F. C. Stout, William B. Myers, Charles M. Dodson, J. A. Eberts, Joseph W. Adams P. A. E. Guerber and W. A. Wilbur. The directors chose the following officers: President, A. N. Cleaver; vice president, F. C. Stout; treasurer, William B. Myers; secretary, Franklin H. Brunner; manager, J. E. Boatrite; superintendent, P. A. E. Guerber, and superintendent of manufacture, H. R. Walters. Warren A. Wilbur, the new member of the board, fills the vacancy caused by the death of Robert H. Sayre, who for many years was a director of the company.

Trade Notes:—

The Joliet Machinery Co., Joliet, Ill., recently incorporated, states that it proposes to manufacture a full line of bakers' machinery.

Walter Gerhardi, 14 Rue St. Lazare, Paris, states that he is interested in anything for modern foundry equipment, including cranes, etc., and would like to have catalogs of various concerns in the United States.

The Orr Foundry Co., Orrville, O., recently incorporated, reports that it will run a jobbing foundry and manufacture all kinds of cast iron castings. Later it expects to enter the brass business and possibly steel. Building and equipment are completed.

The Hill & Griffith Co., manufacturer of foundry supplies at Cincinnati, whose plant was recently damaged by fire, states that it has already begun plans for resuming business, and is now executing orders. The company's office is still located in Cincinnati.

The David Wigert Boiler Works, Galesburg, Ill., recently incorporated, reports that it will manufacture exclusively the David Wigert smoke consuming boiler. David Wigert is president of the company, Doughlas Vaughn, vice president, and B. F. Butler, secretary and treasurer.

The Lake Erie Foundry Co., Buffalo, N. Y., states that its recent incorporation was made necessary because it was not allowed to operate under the old name of the Niagara Foundry Co The company has rented a large factory, formerly used as a foundry, and is fully equipped. It will manufacture all kinds of gray iron castings.

The Link-Belt Co., of Philadelphia, Chicago and Indianapolis, has established a branch office at 321 Ellicott Square building, Buffalo, N. Y., for the convenience of its customers of the driving chain department in that territory. H. C. Minier is in charge of the branch. The company has also established an office at 440 New York block, Seattle, Wash., with E. G. Brabrook in charge, to take care of its increasing Pacific coast business.

The John F. Allen Co., 370-372 Gerard avenue, New York, builder of the Allen portable pneumatic riveting machine, has just received an order from the American Car & Foundry Co. for four more of its riveters secured through its St. Louis agent, A. B. Bowman. Two of these machines are for the Jefferson, Ind., plant and two for the works at St. Charles, Mo. The American Car & Foundry Co. now has in use 125 of the Allen riveters.

Giblin & Co., Utica, N. Y., have assigned their salesmen in the various territories for 1907 as follows: New York and Atlantic Coast states, John H. Winters; Central and Western New York and Northern Pennsylvania, Henry Cowles; Ohio, Michigan, Western Pennsylvania, Indiana, Eastern Illinois and Eastern Wisconsin, George J. Giblin; Wisconsin, Illinois, Missouri and Iowa, T. A. Beal; Nebraska, Kansas, Western Iowa, F. G. Wells; general sales agent, F. L. Nesbit.

Fires:—

The Acme Steel & Malleable Iron Works, Buffalo, N. Y., was damaged to the extent of $500 by fire, Jan. 24.

The foundry of the Foster & Williams Mfg. Co., leased by the Belle City Mfg. Co., at Racine, Wis., was destroyed by fire recently, causing a loss of $10,000.

The old machine shop of the Pillow & Hersey Mfg. Co., Montreal, Canada, which was recently purchased by the Ogilvie Flour Mills Co., was damaged to the extent of $2,000 by fire Jan. 25. The loss was partly covered by insurance.